

BULLETIN
OF THE
NATURAL HISTORY SOCIETY
OF
NEW BRUNSWICK.



NO. XXVII.

VOL. VI. PART II



PUBLISHED BY THE SOCIETY.

ST. JOHN, N. B.,
BARNES & CO., LTD., PRINTERS, PRINCE WM. STREET.
1909.

CONTENTS.

	PAGE.
<hr/>	
<i>ARTICLE I.—</i>	
<i>Notes on the Natural History and Physiography of New Brunswick.—By W. F. Ganong,</i>	85
<i>ARTICLE II.—</i>	
<i>Aboriginal Pottery of New Brunswick.—By William McIntosh,</i>	110
<i>ARTICLE III.—</i>	
<i>Phosphate Deposits of South Carolina and New Brunswick.—By G. F. Matthew,</i>	121
<i>ARTICLE IV.—</i>	
<i>Observations on Weather and Plants.—By G. U. Hay,</i>	127
<i>ARTICLE V.—</i>	
<i>Notes on New Brunswick Weather for 1908.—By D. Leavitt Hutchinson,</i>	132
<i>APPENDIX.—</i>	
<i>The President's Annual Address,</i>	139
<i>Report of Council,</i>	149
<i>Donations,</i>	174
<i>Officers and Committees,</i>	181
<i>List of Members,</i>	183

BULLETIN
of the
NATURAL HISTORY SOCIETY
OF
NEW BRUNSWICK.

NO. XXVII.

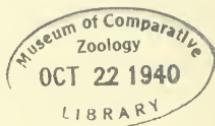
VOL. VI. PART II



PUBLISHED BY THE SOCIETY.

ST. JOHN, N. B.,
BARNES & CO., LTD., PRINTERS, PRINCE WM. STREET.
1909.

8179





ARTICLE I.

NOTES ON THE NATURAL HISTORY AND PHYSIOGRAPHY OF NEW BRUNSWICK.

By W. F. GANONG.

113.—THE PHYSIOGRAPHIC CHARACTERISTICS OF THE UPPER MAIN SOUTHWEST MIRAMICHI RIVER.

Read in abstract November 3, 1908; completed October, 1909.

Among New Brunswick Rivers the Main Southwest Miramichi is second in size and importance only to the Saint John. One of its most striking features is the sharpness with which it is divided at Boiestown into two very dissimilar parts, as unlike in history and conditions of settlement as in origin, geography and geology. Below Boiestown it is a smooth, wide, well-settled river of very uniform characters and obvious origin, cutting in a remarkably straight course through the Carboniferous rocks of a plateau which slopes evenly to the east, while it and its several long branches, after running parallel through their entire courses, are finally brought together by short right-angled bends. Above Boiestown it is mostly a rough narrow unsettled stream of devious course through an elevated and broken country, complex and puzzling in origin, character, and geological correlations, while its principal branches come in at an abrupt angle from the north. In previous notes (Nos. 50 and 93) I attempted an explanation of the physiographic origin of the river, but was able to speak with assurance only of the comparatively simple part below Boiestown. Now, however, as a result of studies during the past three summers,* I can give some account of the complicated and puzzling upper portion with its great branches, which may best be considered separately.

* The observations here recorded were made during canoe and packing trips, which, like all of my New Brunswick voyages, were undertaken in company with a single friend, and without guides or other helpers. In addition to an earlier

*The South Branch.**

This somewhat complicated branch gathers a number of streams from a great arc on the eastern slope of a range of minor highlands, a southerly branch from the Central Highlands, which here separates the Miramichi from the Saint John basins. It has two main sources. The southern (which does not quite fall within the range of the accompanying map), lies close down to the Becaguimec, from one of whose branches it is separated, I am told, only by a knoll; the elevation must fall between 950 and 1000 feet. Thence it flows swiftly but smoothly due north in an open wooded trough-like valley lying between two high ridges. That on the east is broken and wooded, while the other, on the west, is smoothly rounded and settled; thus they are typical examples of the two types of great north-and-south ridges which so fundamentally affect the topography of west

canoe trip from Little Clearwater Brook to Newcastle with Mr. S. W. Kain, I went by canoe in 1907 from Foreston to Newcastle with Professor A. H. Pierce. In July, 1908, also with Professor Pierce, I went by canoe from Barters to above Bedel Brook, and thence on foot, taking advantage of the portage roads and making many side excursions, to the head of the North Branch Deadwaters. Thence we went by Lindsay Brook to River de Chute and the source of its east branch, over to Gulquac, and back to Beaver Lake, down Burnt Hill to the Glassville Portage, across by Beaver Brook Lakes to Clearwater, up this stream to above Red Stone Brook and back to Sisters Lakes, and down the Sisters and Miramichi to Hayesville. In August, 1909, in company with Mr. William Laskey, of Fredericton, I went on foot up the Rocky Brook portage to Spider Lake, thence by the Glassville portage to Lake Brook Lake and Clearwater, the North Branch Burnt Hill, and McKeel Brook to Barters. I have also observed the South Branch and its western watershed during a bicycle trip made in September, 1908.

In the collection of facts concerning this country, and especially in the compilation of the accompanying map, I have had much and invaluable aid from several persons who know that country well. Chief among these is Mr. George Armstrong, chief guide and proprietor of the hunting territory on the Wapske and Gulquac, Mr. Charles Wright, who controls the ground at the big Deadwaters, Lindsay Brook and vicinity, Mr. Donald MacKay and Mr. Wm. Carson, guides on Clearwater and Rocky Brook, and Mr. James Barter, proprietor of Barter's Hotel at the Forks, to all of these men, generous of their time and knowledge, I wish to make my grateful acknowledgments.

* This Branch was surveyed to Foreston by Jacob Allen in 1831, but for the remainder our maps are simply composites made up from sketches taken in connection with land surveys. It is largely settled, from near its source to its mouth, by expansion of native New Brunswick settlers from the River Saint John, and the origin and progress of its settlement is traced in the *Transactions of the Royal Society of Canada*, X, 1904, ii, 94-108. On the Franquelin-DeMeulles map

central New Brunswick. Near Foreston, at about 875 feet elevation, this Branch issues into the open country which is part of a remarkable great trough extending from east to west right across these Highlands, and causing the Miramichi waters well-nigh to intermingle with those of the Shiktehawk. At Foreston the stream becomes navigable, at fair water, for canoes, and swings northeast as a dark narrow pleasant quickwater stream, winding in a flat country between low banks, down to the junction with Elliot Brook, a clear stream which represents the northern source of the South Branch. It rises, as I am told and as the map shows, high up in the elevated country of the Central Highlands, in Victoria County, interlocking with Trout Brook and the Odell, and flows swiftly and smoothly southeast in an open valley. Below the junction the united streams flow southeast, preserving the same general character as above,—a smooth quickwater stream, winding in a very open country between banks of intervalle, gravel and low terrace, very charming for the summer canoe-man; and so it continues, ever rapidly enlarging, and receiving several large branches, down to the Forks (elevation near 800 feet.)

Such is the arrangement of the South Branch waters at the present day, but there is every indication that the present stream is a composite. Thus the part south of Foreston, as shown by its homology with the streams east and west, and the somewhat re-entrant direction of some of its branches, probably flowed southward, and was turned northward by the formation of the Foreston trough. However this may have been, it belongs in one of these great north and south lines between lofty ridges which can be traced to the Tobique in one direction and the St. John in the other, as I shall show in a later note. Again, the

the *Transactions* aforementioned, III, 1897, ii, 364, though with some errors which are here corrected from a later photographic copy), this branch is named *Piptiongobchtik*, obviously its aboriginal Micmac name. This I think must be meant for *Piplogobchtik*, meaning simply "West Branch," involving an inseparable root for "West" (thus Rand, *Micmac Dictionary*, 279, gives *Pebloogowack* for West River, Pictou) with a form of *kej* or *ketch*, meaning "a Branch," and the locative *kik*. It would thus be *Piblogo-ketch-kik*, that is "West Branch Place." It could be simplified for use to Pibletch.

Lake Brook heads so close to Green Brook, and there is so little rise between, that it would be a very easy matter now to turn the South Branch waters out through the Shiktehawk, and it is possible that in pre-glacial times a part of these South Branch waters did thus empty. Elliot Brook is evidently the real morphological head of this branch, as it shown by the fact that it is continuous in direction with the valley of the united streams below it. Furthermore, the directions of the heads of the Munquart and the Shiktehawk are such as to imply that formerly they also emptied into Elliot Brook, and I am told that the country is low in places where such connections would be. Finally the directions of streams suggest a possible old outlet of this Branch into the Nashwaak, and perhaps across by Nashwaak Lake to the Northwest Branch of Napudogan. But this is merely a speculation.

*The North Branch.**

The extreme source of this Branch, which is the extreme source of the Main Southwest Miramichi, I failed, despite determined effort, to reach; but I am told that it heads in large springs two miles from River de Chute, as shown on the map, flows through an open barren, receives a branch from an elevated mass of "black peaks," and has a fall of eight feet. Finally, as

* This Branch figures somewhat prominently in the history of railroad building in New Brunswick. It was first surveyed for seven miles from the Forks by Jacob Allen in 1831, and thence to the head of the principal deadwater by H. M. G. Garden in 1837; and their maps are the foundation of the subsequent cartography. (MS. in the Crown Land Office at Fredericton). In 1844 the valley was surveyed by Lieutenants Simmons and Wood, of the Royal Engineers, in connection with a proposed military road from Halifax to Quebec, but no reports or maps of theirs are known to me, although there is some reference to the survey in Alexander's *L'Acadie* (1849, II, 81, 201, 237). In 1846 it was again explored in connection with the proposed first Intercolonial Railway, as mentioned in Major Robinson's paper on the Quebec and Halifax Railway in *Papers on Subjects connected with the duties of the Corps of Royal Engineers* (II, 1852, 47, 51, 52); but reports and maps of this survey are likewise unknown to me. It was again surveyed in 1864 for a central route for the present Intercolonial Railway, as mentioned in Fleming's *Report on the Intercolonial Exploratory Survey* (Edition of 1868, 17, 24), and in his "History of the Intercolonial Railway." (Montreal, 1876). Finally in the winter of 1904-1905, it was again explored in the search for the best route for the new Transcontinental Railway, and its relations with

a clear little stream, it comes at right angles into the North Branch valley which I have seen thence to its mouth. The main valley at this point belongs obviously as much to Lindsay Brook as to the North Branch, rivulets of both streams coming within twenty feet of one another in a boggy swamp, as I am told by Mr. D. F. Maxwell, who made the railroad surveys through here. This flat-bottomed continuous valley, of 1155 feet elevation, is some 500 to 800 feet wide and lies between an abrupt lofty ridge (some 500 feet high) on the west and an elevated plateau country of equal height on the east. The valley as a whole can be seen with some clearness from sparsely wooded places on the western ridge, from which it appears, despite its position in the very heart of these Highlands, as open and trough-like, and apparently narrowing southward. The bounding highlands are, I believe, intrusive, for the great western ridge consists of red felsite, while the country to the eastward shows some of those typical boss-like summits so distinctive of intrusive rocks. And the origin of the valley appears to be clear. Both its appearance and its homology with other phenomena in this region, all to be considered more fully in a later note, (probably No. 118) imply that it is not primarily a valley of erosion, but occupies an interruption or structural gap in the intrusive highlands, once perhaps partially filled with softer

Lindsay Brook, together with the 7½ miles below the County Line were very fully surveyed by Mr. D. F. Maxwell, though nothing relating especially thereto has yet been published. Meantime, in 1885, the Branch had been studied geologically from the Forks to above the Falls by W. McInnes for the Geological Survey of Canada under direction of Professor L. W. Bailey, and the results are described in Professor Bailey's *Report* for 1885 (G, 27), and embodied in the Geological Map, while Dr. Chalmers' *Surface Geology Map* and *Report* of 1902, M, add a few facts as to elevations and portage roads. Aside from these reports and maps I know of no published references to this Branch, excepting only a sportsman's account of hunting on the principal deadwater, in *Forest and Stream*, Oct. 31, 1903, 335, and another in the same journal for Jan. 2, 1909, 15.

On the Franquelin-DeMeulles map of 1686 this Branch is named *Quechitouch-kik*, obviously its Micmac name. It means, I think, simply "East Branch" (in distinction from the West Branch), including the roots of *oochebenook*, meaning "East" (Rand, *Dictionary*, 95) and of *kej* or *ketch*, meaning "Branch," with the locative *kik*; that is, it is equivalent to *ooche-ketch-kik*, "East Branch Place." This word could be simplified to *Cheketch*.

sedimentary rocks now largely eroded away. Furthermore, and this is a point of importance, this same structural valley, with similar high bounding ridges, can be traced in one direction far to the northward, by way of Lombard Brook, part of the North Branch of Gulquac, and a part of the main course of the Right Hand Branch, while in the other it can be traced south along the main course of the North Branch and thence across to the Upper Nashwaak and on the Keswick. Other similar valleys occur both on the east and the west, as I shall show more fully in the later note.

The river now flows in a southerly direction, and for some miles consists of a series of boggy deadwaters and pools, separated by dark stony rips of little fall and quiet alder reaches of dark water. Thus it continues, though with somewhat increasing fall, down to the East Branch (or Beaver Brook), receiving on the way Franks Brook, which has a low pass of 1206 feet (as shown by the Intercolonial Surveys) to the head of Oven Rock Brook. Below the East Branch, which is a smaller and clearer stream, the character of both river and valley changes. The river bed gradually becomes stony and acquires more fall; ledges of slate appear, and small falls are formed as the river cuts into an old rock floor, which is very distinct in places. The Little Falls, with a fine pool below, are of this character. Furthermore, the hills gradually close in on the valley narrowing it greatly. This character continues down to the county line, just below which the Two Sisters Brooks, wonderfully alike one another, come falling in close together over low cliffs of the old rock floor. Here the river swings to the southwest and its bed becomes smoother, shoaler and wider, with occasional intervalle margin. Thus it continues to the Falls, which have two parts, an upper irregular rocky fall of 6 or 8 feet now covered by a roll dam, and a narrow broken fall of some four feet a few hundred yards below. The dam at the upper fall rests upon a very remarkable ledge of greenish rock displaying a striking concretionary structure. Great rounded concretions of radiating structure, of all sizes up to two

feet across, lie heaped together, flattening at points of contact as if they had been soft sponge-like masses which became petrified and cemented together as they lay piled in masses. Obviously this part of the valley is very different in origin from that above. It is far newer, though long pre-glacial, and although the bottom rocks are sedimentary, the lofty hills on both sides have every appearance of intrusive origin. We have here, I believe, a case in which a stream is cutting into a mass of sedimentary rock caught between intrusive ridges, a condition common in the valleys of this region.

Below the Falls the character of the river changes again. The hills, which seem to be closest at the Falls, open out, and gradually the river issues from the highlands into a great open basin which will be described below. Its bed continues shoal, broad and swift down to Fifteen Mile Brook (a dark, narrow swift stream), but a mile or two lower the stream becomes deeper with less fall, and comes to wind in a flat country between low gravelly banks. Near Bedel Brook, a stream which lies largely in a flat country and has much deadwater, ledges of a soft easiyy-crumbled granite appear. Downward the stream becomes quieter and deeper, receives West Brook (which heads in a pass of 1170 feet elevation through which the new Transcontinental is built), and finally, winding smoothly but swiftly in a flat open country amid pleasant low banks and gravel bars. it reaches the Forks. Through all its lower course it is a pleasing canoe stream, and indeed a skilled canoe man willing to work his way, could in fair water bring a canoe all the way from the East Branch and even, with some effort, from the deadwaters.

Although apparently of simple origin, I believe this Branch is a composite, its upper part at least belonging originally to the Tobique system. The directions of valleys imply that West Brook is the real morphological head of this Branch, while the part above may originally have been tributary to McKeel Brook through a part of Bedel Brook. The reason why the originally Northwest-southeast valleys have been replaced by north and south valleys is found, I think, in the cutting down of softer rocks lying in between great north and south intrusive ridges.

*Miramichi Lake and Brook.**

This very attractive lake, with its fine hill views, pleasing margins of meadow and sand, and charming campgrounds at the eastern end, lies in the southeastern angle of the great Forks basin, which rolls away in burnt barrens on the west, while it gives place to lofty wooded hills near by on the east. But its most notable and striking feature, from the physiographic point of view, is the fact, readily observed from some of the burnt knolls on the south, that it lies exactly in a great valley which can be traced from Half Moon Cove on the Main River through to Napadagon Lake and thence on to the Eastward along the route now taken by the Transcontinental Railway. This valley, I have no question, merges ultimately into that of the lower Taxes, and represents an ancient outlet of the Forks basin, though the details are still to be worked out.

The outlet of this lake, with the exception of an abrupt stair-like pitch (called the Guagus) near the lake, and some gentle rips near the mouth, is a sluggish and easily-canoeable stream, winding in a flat country which is part of the Forks Basin.

McKeeel Brook.†

This stream displays some remarkable features. Rising in a lake said to form an attractive and effective hunting centre, it flows as a quickwater, and somewhat broken, stream in a great

* The lake makes its first appearance in written records upon the map by Playford (MS. in the Crown Land Office), of 1832, showing the survey of the New Brunswick and Nova Scotia Land Company's line which passes through it; but it was given merely in sketch and has not yet been surveyed. Since the lake is attractive, a great game centre, and relatively accessible, it has been visited often by sportsmen, and is mentioned in several of their writings. Thus Sir James Alexander, who saw it in 1844, mentions it admiringly (*L'Acadie*, II, 1849, 210.) Governor Gordon was there in 1862 and thought it very pleasing (*Wilderness Journeys*, Saint John, 1864, 16). It was visited by A. Pendarves Vivian, who spent several days here in hunting, and thought it very attractive (*Wanderings in the Western Land*, 1879, 65). A very charming account of a hunting trip to the lake is given by Ristein in *Forest and Stream* for October 9, 1897, and there is another account, of less interest, in *Recreation* for February, 1906.

† This stream is named *teaganech* on the Franquelin-DeMeulles map of 1686, of course its Micmac name. The termination *ganech* means, I believe, "outlet"

curve at first north, then west, then south and finally southeast, all in a part of the great open Forks Basin. Finally it turns almost east, and for its lower three miles, cuts a deep gulch-like valley, with a rough narrow bed, right across a projection from the highlands on the east, thereby isolating the striking and conspicuous Lewey's Mountain.

The general topography of the region implies that this stream formerly emptied a part of Bedel Brook (the watershed between being so low that lumber has been hauled across from Bedel Brook to McKeel Brook), and perhaps a part of the North Branch. Moreover, it no doubt emptied originally southward into the Miramichi Lake Valley. The lower three miles seems obviously a continuation of that part of the Main Southwest below it, and possibly this united stream drained originally to the westward.

*Burnt Hill Brook.**

This large and important branch interlocks at its source with branches of River de Chute in that remarkable trough-basin which lies in the very axis of the Central Highlands, as will be described more fully under the account of the Clearwater. Its source is in Beaver Lake (a very pretty little lake with rising shores, pleasant hill views, and a great abundance of big moose), lying at the elevation of 1383 feet, as shown by railway levels.

(compare Rand, *Micmac Reader*, 102, *Pulamkeegunuchk*, "an outlet cut through the sand"), while the *tca*, which I cannot explain, very likely describes the fact that the outlet of this stream is in a deep ravine through a shoulder of the highlands, although its upper course is in an open country. The lake, with most of the stream, has not been surveyed, although part of the latter has been located by the County Line survey. It does not figure in any printed literature known to me, aside from a reference in Jack's paper mentioned in the next footnote. It is named, I believe, for a lumberman, while Lewey's Mountain is so called for an Indian chief and trapper.

* This branch is named on the Franquelin-DeMeulles map *Pichiamnach*, its Micmac name, which is obviously identical with the present Indian name of the Big Clearwater. By the Maliseet Indians it is called *Pes-ki-o-mi-ni-sis*, the diminutive of their name for the Big Clearwater. Both words are discussed in the next footnote. The stream has not been surveyed in any part, though the preliminary surveys of the National Transcontinental Railway touched its head at Beaver Lake; for the remainder it is simply sketched between the points established by intersection of the timber lines, though I have added on the accompanying map much information obtained from lumbermen and guides. It was first

It flows southeast to join other branches, as shown by the map, the waters meeting in a large open pleasant basin. Thence the united stream flows southward, at first very gently over gravel, then more swiftly, until it soon comes to cut into a pre-glacial schistose and granite floor.* Meantime the hills close in upon the river in a way to show that it is here cutting into a mass of highlands. Downward the valley is deep, narrow and rough, with occasional falls over granite,—evidently a pre-glacial but otherwise comparatively new valley. Thus it continues down towards the junction with the South Branch, where the country opens out somewhat and the hills are apparently a little lower. The South Branch, at the junction well-nigh as large as the main stream, gathers ample waters from the westward, as shown by the map. The southern waters of this Branch lie in another large basin, which lies so nearly in a line with the great basin at the sources of Burnt Hill and Clearwater in one direction, and with the McKeel Brook Basin in the other, as to suggest that they all occupy another great north and south structural valley, homologous with that of the North Branch. Below the junction of the two streams I have not seen the river except at the mouth, but I am told that it is continuously swift and broken, though without any high falls, and flows through a country continuously lofty on both sides. Its principal branch in this part comes from Beaver Brook Lake, a very pretty lake with highlands immediately on the north but lower country on the south. At its mouth this Branch is narrow and rough, and the valley appears comparatively new.

shown on Allen's map of 1831, and is of course named descriptively for the great burnt hill on the east side of its lower course. Its mouth was visited by Charles Robb in his geological journeys as recorded in the *Geological Report for 1866-69*; and in 1899, as he informs me, Mr. W. J. Wilson, of the Geological Survey, traversed the portage road and made the observations recorded in Chalmers' *Geological Report for 1902*, and shown upon his *Surface Geology map*. A very interesting account of a trip up this river is given by Edward Jack in *Acadiensis*, V, 116. But further than these, no references to the stream occur, so far as I can find, in either scientific or sporting literature.

* As to the rocks in this vicinity, I have noted schists, granites, felspathic granites, schists and veins of granite, all within a limited distance, a mixture recalling that described in Note No. 88.

Such is the present geography, but it is evident that very careful study of the region is needed to yield conclusions of value as to its past changes. Evidently, however, the main stream flows almost entirely in the highlands, a part of the southern branch of the central mass; and it is altogether probable that its direction is determined by that of the great bounding intrusive ridges between which it runs. Possibly the basin below Beaver Lake may have emptied originally to the Clearwater, and it is wholly likely that the older mouth of the Branch lay to the westward, where there is a high gap. Whether or not an old course of the river south into the Taxis can be traced, I am not sure, though I found some indications thereof.

*The Big Clearwater.**

This is the largest of the great branches of the upper part of the Main Southwest Miramichi. As the map will show, its main source interlocks with those of the Gulquac, though not, as would be supposed from the general topography of the region, in a mountainous country, but in an extensive open flat trough or basin lying about 1400 feet elevation (as shown by railway survey levels), in the very heart of the highlands.

In earlier notes presented before this Society I have mentioned frequently the great Central Plateau which lies in between the Tobique, Nepisiguit and the Little Southwest Miramichi, and I

* This stream is called *Pichiamek* on the Franquelin-DeMeulles map of 1686, meant for its Indian name. The Maliseets call it *Pes-ki-o-mi-nek*, as two of our best authorities agree (Chamberlain, *Maliseet Vocabulary*, 58, and Jack, *Journal of American Folk-Lore*, VIII, 207), with which word the *Pichiamnack*, applied on the map of 1686 to Burnt Hill seems identical, and I suspect that, as in some other cases, the names are misplaced. According to Jack the word means "a branch," but obviously this applies only to the first syllable, which has that meaning in other Maliseet words (*e. g.* *Peskahegan*). I suspect that the remainder of the word is identical with the Maliseet *a-moo-i-nec* (of which *Muniac* is a corruption), meaning "a deep gulch." Hence the word would mean "Gulch Branch." The Indian name for Burnt Hill is, appropriately enough, the diminutive of this. The word could be simplified for use to *Peskomek* (accent on the last syllable).

The name of the Branch (in common use "The Big Clearwater") is descriptive of its water in its lower course where it has cleared itself of the brownish color it exhibits in its upper part. It appeared first on Allen's map of 1831.

have expressed the belief that it extended southwest without a break as far as the North Branch of Miramichi. But I find that I was wrong as to this, for in fact, as I have since clearly seen, the great plateau ends just east of the Clearwater and Gulquac, whose branches, indeed, drain its western slope. The highlands then continue to the southwest in the form of a series of great rounded and more or less isolated ridges, whose every appearance and composition suggests an originally intrusive origin. These ridges, however, do not form, as would be expected, a single system, but they split partially into two ranges. The western range which runs southwest and continues with several marked gaps, to the St. John at Moose Mountain, is the striking and mountainous-looking range so prominently seen from parts of the Tobique Valley. The eastern range broadens out immensely to the southward and extends in a broad line, embracing all the country of the Burnt Hill, Clearwater and Rocky Brook, and extends beyond the Main Miramichi nearly to the Taxis. Between the two ranges lies an open trough or basin of an elevation of 1400 feet, occupied largely by great flat bogs, with extensive deadwaters on the streams, or by gently undulating upland, from which isolated ridges or hills rise here or there. It is in this curious basin that the River de Chute, the Gulquac, the Burnt Hill and the Clearwater all take their rise, and all in common escape in their respective directions between the isolated ridges of the highlands. Certainly the arrangement is remark-

From its mouth up to the Forks it was surveyed in 1885, by hand compass and pacing, by Mr. Wm. McInnes, whose survey was used on the geological map, but above that point it is only sketched between the intersections of the timber lines, though I have added to my map much information obtained from other sources. The geological observations of Mr. McInnes are shown on the geological map, and mentioned in Professor Bailey's *Geological Report* of 1885, G., 26, 27, while some observations of Mr. W. J. Wilson in 1899 are on the Surface Geology map and in Dr. Chalmers' Report of 1902. Mr. McInnes in his survey was accompanied by Mr. J. W. Bailey, who has mentioned an incident of this trip in his *Saint John River*, 42. Some account of it near the Forks is given by Edward Jack in *Acadiensis*, V, 116, and there is an interesting narrative of a hunting trip upon it and the streams to the eastward by D. W. Green in *Forest and Stream* in June and July, 1902. But this comprises all the literature of the Clearwater so far as I know. The few miles of its lower course were once a great resort of salmon, and visited by many sportsmen.

able, and its explanation a physiographic problem of the first order.

In the eastern part of this basin, in a country of flat bogs, lies the main source of the Clearwater, while other important branches are shown by the map. I have not seen it above the upper Forks (two or three miles above Red Stone Brook), where it is a sluggish brown stream winding through gravelly pools. Downward, it becomes swifter and more broken, soon merging over to a swift rough stream, rushing noisily along over cobbles and boulders. Meanwhile, in a valley that is evidently ancient, it is entering the highlands, which rise into splendid great wooded ridges. Thus it continues down to the Forks which lie in a pleasant open basin, receiving the darkwatered Northwest Branch, which in turn near its mouth receives the smaller and very clear Little Northeast Branch. Below these Forks this river is swift and broken, running over coarse drift in a wide valley between great ridges parallel with the stream, and this character it keeps clear down as far as I have seen it, that is, a little below Moose Brook. In this part, it receives a number of small branches, some of which, *e. g.* Moose Brook, have cut very deep gorge-like gulches into the granite hills, while another, Lake Brook, empties a most attractive lake lying in a niche of the highlands. In its lower five miles, as Mr. J. W. Bailey tells me, it is very rough and steep-walled, with several rocky falls.

Turning now to the question of its physiographic origin, I must admit that no stream in all New Brunswick has puzzled me so much as this. Its upper part west of the Highlands may once have been tributary to the Tobique, but the part in the Highlands seems ancient and homogeneous. The great ridges on each side, now parallel with its course, suggest that the valley is not wholly of erosive origin, but is primarily a trough between these intrusive ridges. The very rough character of its lower course implies that this is new, possibly even post-glacial, in which case its old course was very probably through the present Gilman Brook. But there is no sign whatever, that I could find, of such an old course as one would expect southward into the Taxis system.

*The Sisters Brook.**

This comparatively short but otherwise important stream has its principal source in the attractive Sisters Lakes, which lie in a position shown by the map. The western lake, lying up against an abrupt ridge on the west, is especially pretty, while the eastern is in flatter country which apparently extends a long way to the east and north. The stream runs with moderate flow at first, and receives branches as shown by the map; but as it runs southward it enters a high country, and thence downward falls incessantly in a very deep V-shaped valley between parallel ridges of great height. Indeed the hills between it and the Clearwater appear to form an axial line of these highlands. Finally it falls by a very narrow gap into the valley of the main river, when it splits and enters the main stream by two nearly equal channels, one of which has recently been dammed for lumbering purposes.

It seems probable that this stream is now only a portion of its former extent. The open basin extending east of the lakes, in conjunction with the peculiar positions of the Tahoe and Hurd Lakes, suggest a former outlet of this basin eastward into Dungarvon. On the other hand, the extension of the basin northward from the lakes implies a former greater stream there, with possibly an old connection with the upper Clearwater. Also the marked alignment of the East Branch with the upper part of Rocky Brook implies a former connection there. But the

* This stream is named *Tabouimters* on the Franquelin-DeMeulles map of 1686, obviously its Micmac name. It is called by the Maliseets *Taboimnital* (Jack, *Journal of American Folk-Lore*, VIII, 207), which, allowing for the usual substitution of *r* for *l*, is practically the same word. Its general meaning is plain, for *Taboo* means two, of course in reference to its peculiar two outlets (one now closed artificially for lumbering purposes), which have given it the English name of Sisters. It appears first on the Allen map of 1831, but is curiously enough omitted from most later maps. It has not been surveyed, but is only sketched between timber line intersections. It was visited by W. J. Wilson in 1899, from whose observations it appears on the Surface Geology map. Although the lakes are a great hunting ground for moose, I have found only a single reference to it in sporting literature, viz., the article by Green mentioned in the preceding footnote.

solution of all these interesting questions awaits a more thorough study than can be given by any method not based on an accurate topographical survey.

*Rocky Brook.**

This large branch rises in the very attractive Moose (or Rocky Brook) Lake in a relation to Little Southwest Miramichi waters fully described and mapped in Note No. 86 of this series. Thence downward to the forks of the Spider Lake Branch I have not seen it, but all indications make it a rough stream. The Spider Lake Branch issues from an extensive open country, containing ponds and deadwaters, which are margined by great black spruce bogs and connected by sluggish dark boulder-strewn streams,—a typical country of bad drainage broken by low ridges. This character the country appears to exhibit also off to the eastward, and no doubt the same features continue into the region of innumerable ponds which lie at the source of the Dungarvon. Evidently we have here another of these great basins in the midst of highlands, very like that at the source of the Clearwater, and a characteristic feature of the interior of New Brunswick. Spider Lake, lying between ridges and irregular in outline, is attractive, and being within easy reach of boggy ponds is a hunting centre of importance. Its outlet falls much in places, and elsewhere forms long deadwaters. The united streams runs southward in a bed which is rough and stony, at least at the several points where I have seen it, in a country which is high on the west but lower on the east. A

* This is, no doubt, the stream to which the Micmac name *Tatagoumisak* is meant to apply on the map of 1686. The root *tata* is no doubt the same as in *Tetagouche*, though its meaning is not clear, while the root *goumisak* appears to mean scraggy and rough (compare Rand, *Micmac Reader*, 100, *Misegumisk*, meaning "scraggy and rough"), a word which well describes the character of the stream. It appears first on the Allen map of 1831, and its relations with the Dungarvon were well laid down in general on the Scully (MS.) map of the Northumberland-York County Line in 1832. There is some account of a preliminary railway survey by W. H. Tremaine passing near its sources in *Report on the Intercolonial Railway Exploratory Survey* (Edition 1868), 93, and a mention of its source lakes, in this Society's Bulletin, V, 1904, 319; but otherwise no references to the Branch occur in any records known to me.

few miles down it makes a great bend to the eastward, and here its course is quieter, in part at least a gravel-bottomed quick-water. Then it turns again southward and cuts into a rocky bed in a country of increasing height. For a few miles below I have not seen it, but it is said here to be very rough, and to include some falls, one of which is 18 feet in height. Below, where the portage road is near, it is a quieter, smooth, gravel-bottomed stream, canoeable and pleasing. Farther down it becomes again rough, and for the lower six miles, as I know in part by observation and in part from report, it is everywhere a rough, rocky strong-running brown stream in a wide valley winding among great ridges.

Such is the arrangement of those waters at present. There is no doubt, I believe, that the uppermost waters, and even those down to the easterly bend, originally and in part pre-glacially, were tributary to the Dungarvon, and this is no doubt true of the easterly bend itself, as shown by its direction and the presence of the re-entrant little stream at the turn. Moreover, the directions of the branches below strongly suggest that parts at least, *e. g.* the Tahoe-Hurd valley, were also tributary to the Dungarvon. The lowest part, however, appears to have had the same evolution as the Sisters, Clearwater and Burnt Hill, *viz.*, a stream let down between great intrusive ridges. But even here is a problem, for the parallelism and alignment of the streams of the region would suggest for Rocky Brook a former outlet through the present course of Fall Brook.

One of the most interesting physiographic features of this stream, however, is the nature of the watershed between it and Dungarvon. For this watershed, which continues south and determines the direction of the Miramichi between Fall Brook and Boiestown, is extremely narrow and parallel with Rocky Brook, while the Dungarvon branches start off close by and nearly at right angles. The explanation, however, is not difficult on a supposition which I have advanced in a preceding note (No. 111) and which I repeat a page or two later.

*The Main River from the Forks to Boiestown.**

Having thus considered the characteristics of all the great branches of the Upper Miramichi, we turn now to the main stream. The Forks lie in low intervalle country, and this in turn is near the focus of a remarkable great drift-floored basin which extends to the westward in continuity with the wide Foreston gap, northward up the North Branch to Bedel Brook, northeast up McKeel Brook, southward to the Nashwaak sources, and east to Lewey Mountain and the Narrows, while it has an outlet to the southeast across Miramichi and Napudogan Lakes as already described.† This basin is broken by low ridges, but is in general sharply marked off from the bounding highlands, which rise abruptly 500 feet or more above its general level. This basin, like others in the region, no doubt owes part of its characters to erosion, but its abrupt bounding walls of rock, which I take to be intrusive, imply that previously it was an area, perhaps originally filled with softer rocks and perhaps not, left unoccupied by such intruded bosses and ridges as form the neighboring highlands. It is because these ridges all have a north and south direction that the streams, ever eroding down between them, have also come finally to have north and south directions, though these may originally have been very different.

* This part of the river was first mapped, with the great branches, on the Franquelin-DeMeulles map of 1686, when it is called by its ancient Micmac name of *Ristigouchiche* or "Little Restigouche," Miramichi being a word of unknown, and probably European origin. It was first surveyed in 1831 by Jacob Allen, whose map is the basis of all later ones, though the upper part was re-surveyed by H. M. G. Garden in 1837 and in 1867. The river has been studied geologically by Robb, as shown by his report to the Geological Survey of Canada in 1866-69, 173, though Ells, Chalmers and others have occasional references thereto in their reports. The river is still wholly unsettled from the Forks down to Hayesville. Its branches have yielded vast quantities of lumber, and some time ago it afforded good sport in salmon fishing, in which connection it is mentioned by several writers, notably by Gordon, Alexander, and Vivian, who are cited in the footnote under Miramichi Lake.

† A former different outlet for the waters of this basin is mentioned as probable by Chalmers in his report for 1902 (12, M.). It is not improbable that the entire basin once emptied by way of the Foreston trough into the St. John, which would have made a river homologous with the Tobique.

Across the drift of this basin the main river flows quietly between low wooded banks and through long reaches of stillwater separated by lines of boulders or gentle rips. Gradually it becomes swifter, rapids develop, and low ridges appear, and thus it continues, a very pleasing river for the canoeeman, down to the Narrows, where it leaves the basin and plunges abruptly into the highlands, from which it does not issue until after Rocky Brook is passed. Throughout its course in the highlands the valley is deeply cut into a wider trough valley, which can be seen from various burnt hills along its course. Passing down from the Narrows (simply some marked ledges of granite), the river is everywhere swift and much broken by rapids (mainly caused by ledges of slate), which are worst at Slate Island and Burnt Hill, while the valley walls are steep and backed by fine hills and ridges. At Slate Island and McLeans Brooks the valley opens out somewhat, and the latter brook occupies a valley far wider and more open than the present stream could have formed. Farther east the country becomes high again, but just above Burnt Hill there are evidences of an old high gap through which the Burnt Hill River perhaps emptied southward through Lower Hayden Brook. At the mouth of this river are clear evidences of the old pre-glacial rock floor into which this river is now cutting, and there are traces of a pre-glacial valley to the southward of the present course. Below Burnt Hill the river continues swift but shallow, and winds in a deeply-cut valley amid splendid great wooded ridges and hills, offering some of the wildest and finest river scenery in all New Brunswick; and so it is down to the Clearwater, where granite hills appear. Here, theoretically, one looks for signs of an old high gap continuing this river to the southward, but such I could not find. Then the river continues for a time of much the same character, but with the country gradually falling off somewhat, down to the southerly turn beyond Rocky Brook.

Through all of its course from the Narrows to below Rocky Brook, the highlands are fully as prominent on its south as on its north side. This highland mass extends southward to a

distance which I have not traced; but apparently it nowhere crosses the Taxes. There is, however, this difference between the directions of the ridges on the two sides of the river,—that while on the north they come down to the valley at a sharp angle, in parallelism with the large branches, on the south they run largely parallel with the river's course, presenting splendid great wooded slopes of notable uniformity for long distances. And this parallelism with the river is further emphasized by the corresponding directions of Trout, McBeans and Hayes Brooks. Evidently the intrusive ridges on the two sides of the river belong to two different systems or centres.

Turning now to the origin of this part of the river, it is plain that it is pre-glacial in origin, as shown by its flood plains and remnants of rock floor, though it is not at all an ancient river, but one relatively new. The explanation of its origin is, however, fairly clear. It represents a valley lying in between two separate and distinct highland masses on the south and north. It thus occupies an elongated basin comparable with that in which lie the sources of Gulquac and Clearwater. At first, no doubt, this basin was occupied not by one stream, but by parts of several; but gradually, as the softer slates filling this basin became eroded out, letting the stream down lower and lower, they worked themselves together into the single valley of the present. Meantime the great branches on the north were similarly working down into the softer rocks between the great ridges, whose directions have ultimately determined those of the valleys, despite their earlier independence. I predict it will be found by more extensive geological study that the slate rocks are confined to these valleys, and that all of the highland ridges are granite or felsite.

Below Rocky Brook the river turns southward, its direction here being determined, like that of Rocky Brook, by a low highland ridge on the east. Downward the country becomes lower and opens out, until, near Boiestown, this river falls into the great Taxes—Southwest valley, which has a very different geography and evolution, as I have already traced in my earlier note.

114.—ON AN INDISPENSABLE PRE-REQUISITE TO A SUCCESSFUL
FORESTRY POLICY FOR NEW BRUNSWICK.

Read January 5, 1909; addenda, October, 1909.

It must be a matter of rejoicing to the members of this Society that the citizens of New Brunswick, and therefore their government, have finally awakened to the importance of a policy of conservation of the public forests and related interests. Thus the first real step towards forest development has been taken. The second, unfortunately, is likely to prove almost equally slow and costly,—namely, a realization that a forestry policy will not administer itself and cannot be carried out by anybody to whom it happens to be convenient to turn it over, but that it is a matter for trained experts. As the members of this Society well know, I have spent much of my summers for some twenty years past in the woods of New Brunswick, and have penetrated, unguided, to its most remote parts, in pursuit of scientific facts about the geography and natural history of the province. I have thus had opportunity to see at first hand, and uninfluenced by those who may have special interests to advance, the methods, the results and the needs of administration of the public lands. Further, my interest in these matters has led me to seek information as to the ways in which they are managed elsewhere and the results of such management. And, finally, I think the conclusions I have reached are as nearly disinterested as can possibly be, since my attitude towards the whole matter is abstract and scientific, and I have no personal ends, present or conceivable, to serve.

Upon this basis, and with these data, I have been led to conclusions which are briefly as follows: Our forestry interests, including therein lumbering, hunting, trapping, fishing, opening of lands for settlement, regulation of water supplies and development of water powers, provision for sportsmen-tourists, for wild parks and for sanatoria, are capable of a vastly greater and more profitable development than they have yet attained; but on the other hand the conditions are so complex that their efficient

development and management is only possible by the concentration of their administration in the hands of some responsible body which can combine continuity of policy, skilled knowledge, initiative, experiment, executive authority and the possibility of efficient and economical business administration of details. Can anybody who knows the recent history of politics in New Brunswick and the present state of political ethics in Canada, suppose that a continuously economical and efficient administration of public utilities is possible under political management? Yet at present the administration of the forestry interests of the province is under purely political control, not only in general policy, but down to the minutest detail. Aside, however, from the purely political dangers which threaten a forestry policy, it is a fact that the present system of management is, from its very nature, prohibitive of efficient administration and development. The forest interests of the province are administered at present by the Department of Crown Lands under the Surveyor-General. Now the Surveyor-General, no matter how capable, devoted and upright, knows nothing of these matters when entering office, and must depend upon advice of his subordinates. Moreover, he has little inducement to educate himself thoroughly in them since he has his own private business to absorb him, and since his tenure of office is uncertain, not only because of the hazards of elections, but also because of the likelihood of promotion to a higher portfolio. It is a most fortunate fact that the management of the forest lands under the present Surveyor-General is remarkably energetic and efficient; but experience shows that such excellent administration is exceptional, and will not be continuously maintained under future officials. The members of the permanent staff of the Crown Land Office are so fully occupied by the regular duties of that office, that leisure and opportunity for study, for observation in the forests themselves, and for travel and examination of the methods and experience of other countries, is wholly excluded. Under such conditions nothing but a drifting policy can be expected, and a progressive policy is impossible.

Such are the conditions; now what is the best remedy? Elsewhere the executive administration of forest interests is in the hands of special bodies, either a department composed wholly of experts, as in the United States Division of Forestry, or else forest commissions employing expert assistance, as in many of the States. Taking everything into account, I believe the best solution under New Brunswick conditions would be found in the appointment of a Public Lands Commission, composed of four or five eminent citizens of the province, representing the different interests involved and serving without pay, but provided with a salaried expert secretary, whose entire time and energy could be devoted to the executive details of the commission's work, and to the study of forest problems here and elsewhere. The commission would thus constitute the executive manager of the forest business, and would suggest legislation to the legislature, in whose hands, of course, the legislation would wholly remain. Such a plan would ensure continuity of policy, stability of administration, economy of management and adaptability to conditions based upon knowledge. Its results might not be perfect, but they would far exceed anything possible under present conditions.

Following the publication of this note (which appeared in the *Saint John Daily Globe*, January 7, 1909), I have been favoured by the opinions of the Premier and the Surveyor-General of the Province upon its proposals. Aside from other difficulties, the plan appears to them impracticable for the reason that no such commission could be found to serve without salaries which would be prohibitive. But there is an alternative. I believe it is a fact that the timber lands of New Brunswick owned by private parties or companies, are better conserved and managed than the public lands. It is more important for the future prosperity of New Brunswick that the timber lands should be well preserved and well managed than that small profits should go to the government instead of larger ones to individuals. It would seem best therefore to allow these lands to pass gradually

into private hands. If the proceeds of their sale were wisely used and invested, and not wasted, the end result would be the same to the people of the province, so far as taxation is concerned, while the general prosperity would be much enhanced by the better management of the forests.

115.—THE HIGHEST NEW BRUNSWICK WATERFALLS.

Supplementary to Note No. 109.

In a note published in the preceding Bulletin of this Society, I gave the results of an attempt to measure by triangulation the height of the Fall Brook (Miramichi) waterfall, commonly reputed the highest in New Brunswick. I have never been satisfied with that measurement, and in August, 1909, with the aid of Mr. William Laskey, of Fredericton, I made a new measurement by what may be called the natural method,—viz., lowering a weighted cord from the brink of the fall to the pool below. The result, when corrected for inclination of the cord, stretching by the weight, etc., gives the fall a total height of about 110 feet. This is a great difference from the 75 feet given by the triangulation, but the conditions of the latter were so unfavourable that I consider it of little worth in comparison with the recent measurement. I may add that while I am satisfied as to the substantial correctness of this latter measurement, I propose to measure the fall again, using a non-elastic wire and precautions which will ensure a result accurate within a foot.

It will be of interest to add here two references to this fall which I have found since the earlier note was written. On Scully's M.S. map of 1832 (in the Crown Land Office), showing the County Boundary just to the eastward, the fall is marked, with the words, "Falls nearly 100 feet perpend'r." This is the earliest known reference to it. Again Dr. Charles Robb, in the Report of the Geological Survey of Canada for 1866-69, 192, says it has "at least 130 feet of uninterrupted descent, presenting a singularly wild and picturesque scene." Probably it was

from this statement that the height of 120 feet given by the Geological map was derived.

On the same trip we also visited the Trout Brook fall a few miles to the south, and about a mile up the stream of that name. It is a very fine double fall of two very symmetrical pitches, an upper of about thirty and a lower of about twenty feet, separated by a shelf and pool.

While the Fall Brook Fall seems firmly established as the highest in all New Brunswick, I am told by Mr. J. W. Bailey that its pre-eminence is threatened by two very high falls which he has seen on the Merry Pitcher branch of the Big Salmon River in St. John County. It is to be hoped that Mr. Bailey will himself present to the Society a description of these little known falls.

116.—A TEST OF THE ACCURACY OF ANEROID MEASUREMENTS IN INTERIOR NEW BRUNSWICK.

As the Bulletins of this Society bear witness, I have for several years past been making many aneroid measurements for elevations in the interior wilderness parts of New Brunswick. Naturally I have been watching with special interest for the first test of their accuracy by the standard method of spirit levelling. Such a test was made in connection with the exploratory surveys of the Transcontinental Railway, though I have only recently obtained the data, which are still unpublished. In 1905 a party under the charge of Gillmor Brown, C. E., ran a line of spirit levels from Gulquac Lake, which was assumed, from my aneroid measurements as recorded in White's Altitudes of Canada,* as 1330 feet, to Beaver Lake at the head of Burnt Hill Brook,† which they made 1371 feet. This latter lake, however, had been

* The original data are in this Society's Bulletin, No. XIX, 1901, 329.

† This lake is shown on the map accompanying Note No. 113 in this Bulletin. On that map the line of exact levels from this lake to Gulquac Stream is taken from the map of this survey, a copy of which, because of excessive red tape, I had much trouble in procuring.

found by spirit level, by D. Maxwell, C. E., to be 1383 feet, thus making Gulquac Lake by spirit level 1342 feet. My aneroid measurement of 1330 feet was therefore only 12 feet in error, and that on the conservative side. I am quite prepared to admit that such surprising accuracy of aneroid measurements made so far from a base is in considerable measure a matter of coincidence, and that they will not all run so accurately. Nevertheless, as my measurements in that region have all been made with the same instruments, methods, and precautions, I have confidence that, as a whole, they will be found not far from the truth.

ARTICLE II.

ABORIGINAL POTTERY OF NEW BRUNSWICK.

BY WILLIAM MCINTOSH.

The art of the potter takes an important place in the history of man's handiwork, and dates from a remote antiquity. Its products, and particularly its pre-historic remains, are of the greatest value to the historian.

It has been said: "Of all the movable products of barbarian art, that pottery is the most generally useful in locating vanished peoples and in defining their geographic limitations and migrations." When the French came to New Brunswick, the aboriginal inhabitants were making and using rude vessels of clay; and to-day we find on the shores of our lakes and rivers, and on ancient camp sites, fragments of this crude potteryware. What these remains will teach us of the people who inhabited this region in pre-historic times, remains to be seen. At present, our researches have not progressed sufficiently to make possible any conclusion regarding the antiquity of man in this province, or if more than one race or people have inhabited it in past ages. Further research and study are necessary before any definite conclusion can be arrived at regarding the antiquity of the pottery of New Brunswick.

It is true, a careful study of the material available makes possible some interesting theories regarding the pre-historic inhabitants of the region, but the author does not desire to advance theories which further research may fail to establish, or even discredit. We hope soon to be in possession of data which will make possible a further consideration of the pottery of New Brunswick and the examination of a number of interesting questions not dealt with in this paper.

The material upon which this article is based is in the museum of this Society, and includes: The fragments discovered

at Bocabec by Dr. Geo. F. Mathew.* These sherds do not differ in composition or ornamentation from the pottery of the St. John river valley. The collections made by S. W. Kain in the lake district of the St. John River—an almost complete pot†—and many other fragments collected at Maquapit Lake by Duncan London; a number of fine fragments collected at Indian Point, Grand Lake, by David Balmain; one thousand one hundred fragments obtained at Princess Park, Grand Lake, two years ago by A. Gordon Leavitt and William McIntosh; and eight hundred fragments collected by the writer at the same place during the past summer.

Princess Park, where most of the above materials were obtained, is one of the most beautiful places on Grand Lake; a wide crescent-shaped beach about a mile in length forms a sea wall, which confines a small lake, locally known as the Keyhole. This lake, no doubt, at one time formed part of Grand Lake. The sea wall is covered with a growth of Princess Pine‡ (*Pinus banksiana*). This small lake is a favourite spawning place for many kinds of fish, which find their way into it from Grand Lake by a narrow and shallow outlet, where they are easily caught. For this reason, the Indians were attracted here, and occupied the inner slope of the sea wall as a village site.

In this place conditions are such that it is impossible to tell, with any degree of certainty, how old the pottery may be. The sherds are found where the ground is flooded each year and the surface changed by the action of water. Therefore, no undisturbed accumulation of pottery and camp refuse is found.

In this locality over three-fourths of the pottery occurs within fourteen inches of the surface. Nothing has been found lower than twenty-nine inches. The scarcity of sherds in the lower deposits may have been due to the short period in each year in which the area would be habitable; for a lowering of the ground

*Described in "Discoveries at a village of the stone age at Bocabec, N. B.," by G. F. Mathew, M.A., F.R.S.C. See Bull. No. X of the Natural History Soc. of N. B.

†See Bull. Nat. Hist. Soc. of N. B., Vol. V., page 345.

‡Local name for the Gray or Northern Scrub Pine.

twenty-nine inches would bring the surface little above the present summer level of the lake. Accordingly, the greater number of relics near the surface may indicate longer occupation, due to protection from the spring and autumn floods. A careful record was kept of the number of fragments found at various depths. These, on comparison, show no marked difference in composition or ornamentation. There is no reason for supposing that the pottery-makers of this region, as judged by these remains, extend back to a remote period, or that they were other than the ancestors of the Malecites, who are still found along the St. John River.

The pottery remains which we have collected give abundant evidence in reaching a correct estimate of the range of the pottery of the region. The Indians of New Brunswick had passed little beyond the simplest stage of vessel making; but it must be remembered that conditions were unfavourable for the development of the potter's art. The aborigine was a hunter, changing his place of abode frequently. This would strongly affect pottery-making, which never flourishes among nomadic or semi-sedentary peoples. Wood was abundant, from which were made bowls and vessels, both light and strong. The larger cooking vessels were wooden troughs, and cooking was done by means of hot stones, as described by Denys and other early writers. From the bark of the canoe birch the Indian manufactured watertight vessels of every description, as his descendants do at the present time.

Storage vessels for water were not needed, for in every part of the country water is abundant; therefore, it is not remarkable that the pottery of the region is elementary in character. Hitherto, only fragments have been found, but in a number of instances it has been possible to piece these together to form a section of a vessel from rim to bottom, thus obtaining accurate knowledge of the shape, size and ornamentation. At present we have no evidence to show that other than simple wide-mouthed culinary vessels were made. In shape, they are limited in range, including only bowls and wide-mouthed pots. The smaller bowls were about five inches in diameter, and had a

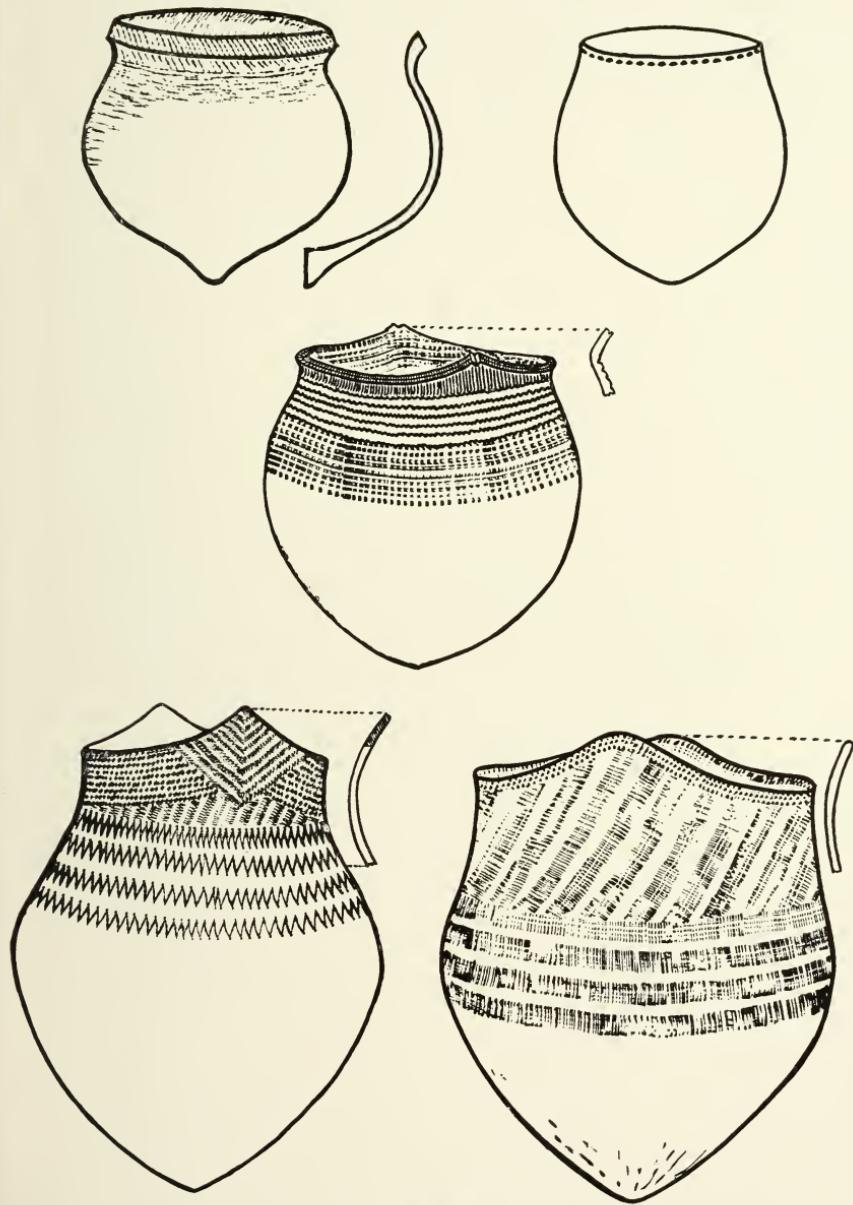


PLATE 4.



conical or rounded bottom. The ware is of a finer character than the larger vessels; the clay contained less tempering, and, in some cases, the walls are not more than three sixteenths of an inch in thickness. The larger pots were not more than thirteen inches in diameter, and about the same in depth. The neck was slightly constricted, the body swelling and the base conical. Typical examples are shown in Plate IV. A great variety of clays were used. Some fragments show a bright red, high grade clay, but in general it is impure. The amount of tempering material used varies greatly, some of the smaller vessels contain a medium quantity of fine tempering, enabling the potter to make a thin ware with a smooth surface. In many of the larger pots only enough clay was employed to bind the substances used for tempering. The tempering material was of many kinds, including pulverized granite, sand and other mineral substances. Some fragments glitter with iron pyrites, others show quantities of milky quartz—biolite, feldspar, etc. Some of the Bocabec sherds contain fragments of shells. In a number of the smaller and finer vessels there are indications which show that after the article was modelled, a clay wash or slip has been applied; this would give the potter a smooth surface for decorating or polishing. Many fragments are so smooth as to leave little doubt that the potter had polished the surface prior to burning.

A number of vessels are black inside, not the result of charring the food, which is common, but a fine smooth black, evenly distributed over the interior of the vessel. This blackening was evidently done in the process of manufacture.

In colour, the pottery ranges from a bright terra cotta red through various shades of browns and greys.

It is quite evident the potteryware was not uniformly burned, for in the same levels are found fragments of a hard, durable ware, and in others it is so friable as to be crushed between the thumb and finger. Nearly every pot is ornamented, and no two are exactly alike. Usually about two-thirds of the outer surface of the vessels are decorated, greater care being taken with the

work near the upper part of the pot. The top of the rim is nearly always ornamented, and the inside usually shows an imprint near the top.

The ornamentation is archaic, and consists of combinations of straight lines and simple indented patterns. True curves are wanting, the nearest approach to a curve being made in rocking a wide indenting tool over the surface, and in combination of two or more straight lines placed at a slight angle one to the other, as shown in some of the fragments illustrated.

Many of the designs resemble the spruce root stitching and porcupine quill ornamentation of the birch bark vessels, and it may be the designs on the pottery were suggested by those on the older bark vessels which no doubt long antedated potteryware among the tribes inhabiting this region. With few exceptions, the greater part of the decorations were made by using an indenting tool rocked over the surface; this implement was usually toothed, but sometimes wavy or zig-zag, and of various sizes. One of the larger was over two inches in width, while others were only about a quarter of an inch in width. On nearly every vessel the stylus also was used.

The textile designs, so common in many Algonquin areas, are entirely absent. Only two small fragments show markings—which are probably cord patterns. The indenting implement in a variety of forms, used for rocking over the surface, or for stamping or indenting, the stylus, and possibly a cord, are probably the only implements used in ornamenting the potteryware examined by the author.

FIG. 1. From Princess Park.—The entire outer surface has been rocked over with a toothed tool, after which the design was completed with the stylus. This is one of a few designs in which it would appear that curved lines were used, but an examination of the fragment shows the design to have been produced by a series of incised marks and straight lines. A line has been drawn on the clay, one inch from and parallel with the rim. In this line a series of oblong dots have been imprinted. Near the rim is another series of elongated marks, and between the two

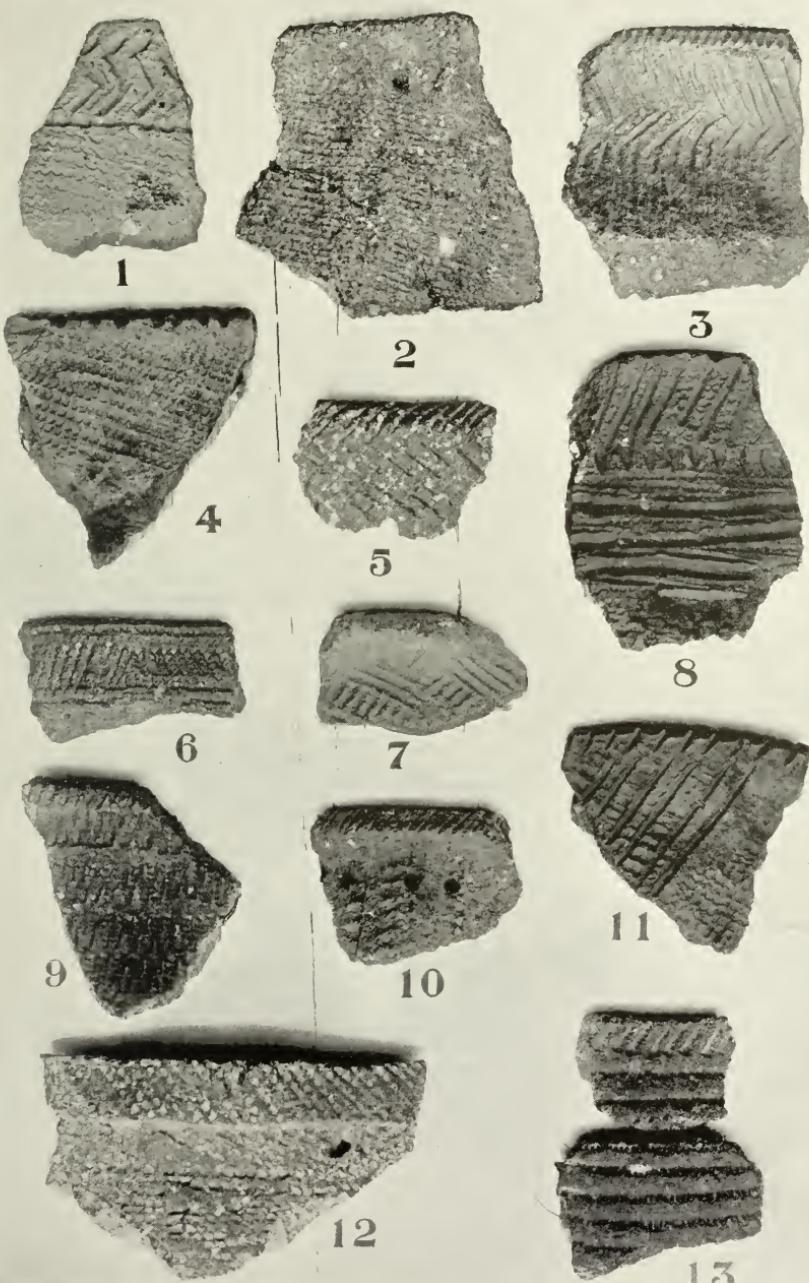
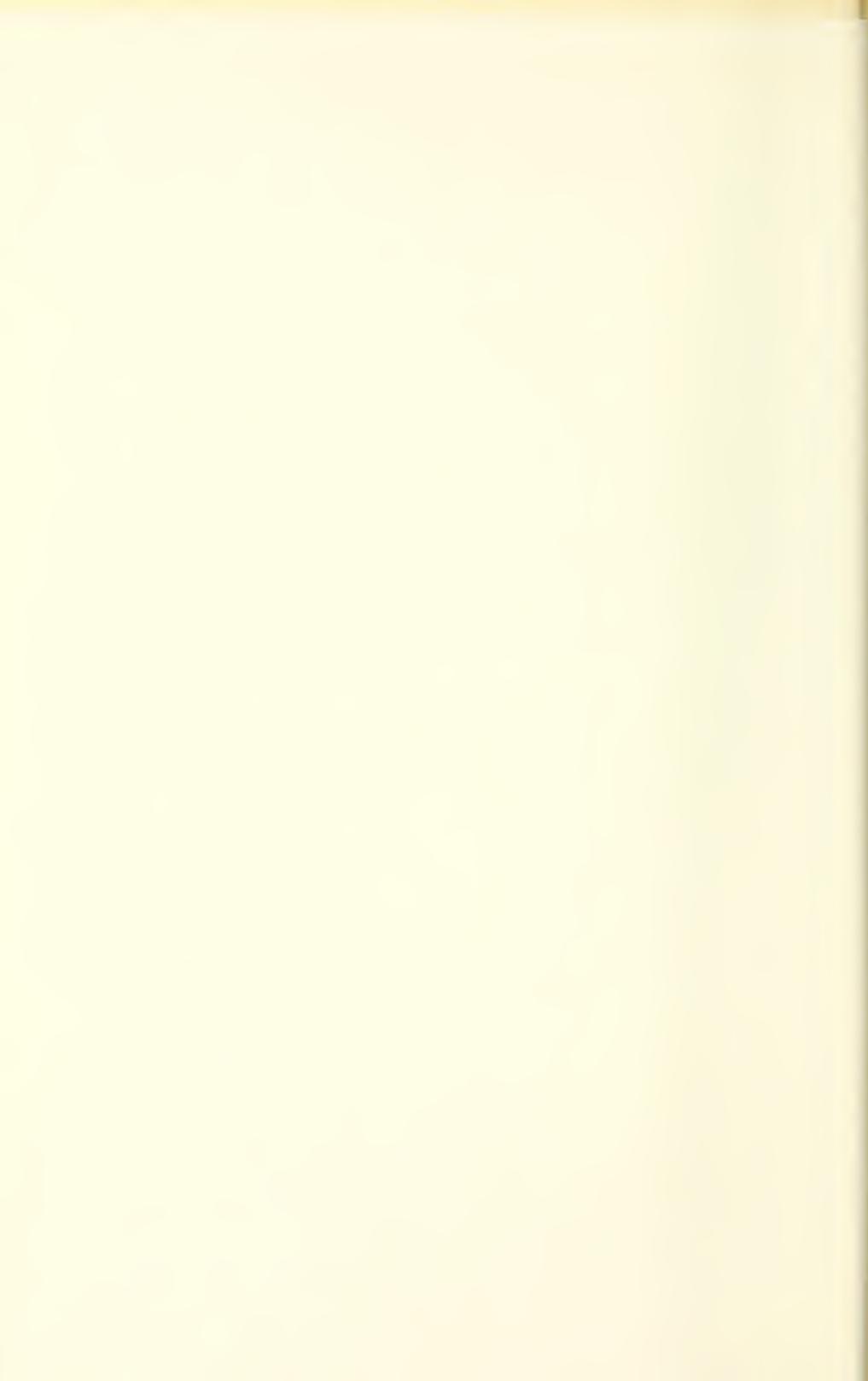


PLATE 1.



lines of dots a series of chevrons, the whole appearing like a continuous curved line. On the top of the brim is a series of dots, and another on the inside. The inner surface is entirely covered with a very fine saw-toothed design rocked on.

FIG. 2. A plain, textile-like design, which is carried over the rim and down the inside over half an inch, entirely the work of a toothed rocker. The hole near the rim, which has been made while the clay was soft, is over one-eighth of an inch in depth, so nearly through as to raise a protuberance on the inside. The ear is a unique feature not met with in any other fragment in our collection. Like the hole, it was made after the design had been rocked on the pot. Whether the ear and hole were for use or simply for ornament, is not apparent. Two or more of these ear-like projections on a vessel would prevent a cord tied around the pot from slipping over the top; or was this pot made early in the French period, in imitation of the French pots, which all had perforated ears?

FIG. 3. From Princess Park.—The lower part of the design is rocked on. Further up a herring-bone pattern has been made with the stylus. Three almost straight lines meet in such a way as to appear like a series of curves. The top of the rim is plain, with rows of indentations on either edge; inside there is a rocked pattern about one inch in width.

FIG. 4. In this Bocabec sherd the design has been made with a rocking implement having twelve or more teeth, and making an imprint nearly an inch in length. The rim has been decorated with a double row of dots, and a rocked band three-fourths of an inch in width runs round the inside.

FIG. 5. This fragment has an unusually thick rim. The design, as shown in the figure, was made by a toothed indenting tool. The same implement has been used in making a series of oblique indentations on the brim, and for making a band of perpendicular imprints on the inside.

FIG. 6. From Maquapit Lake.—This design is the work of a seven or eight-toothed indenting tool.

FIG. 7. Two fragments of this vessel were collected at

Indian Point, Grand Lake, by members of the Summer Camp, 1893. The design is unique and effective, made by a three-toothed indenting tool drawn obliquely across the surface. The implement was then drawn at right angles across the first imprint, producing the design shown in the figure—a row of heavy perpendicular markings run round the inside of the rim.

FIG. 8. A very interesting fragment from Princess Park. Twenty-three pieces of this vessel were found. The clay is of excellent quality, with a medium amount of fine tempering. The entire outer surface was rocked over with a fine-toothed tool, after which the stylus was used in making a number of heavy dashes on the body of the vessel. One inch from the top is a horizontal row of imprinted marks. From this row to the rim of the vessel is a series of oblique lines, with a row of dots on the rim. The design is an effective one, and proclaims the marker no novice in the potter's art.

FIG. 9. This Maquapit Lake sherd shows four horizontal lines of ornamentation, each of which was made by a six-toothed indenting tool rocked over the surface. The same implement has been used marking the top and inner surface of the pot.

FIG. 10. In this fragment, part of the design is somewhat obscure. The clay has been lightly marked with an indenting implement, after which the potter has made a number of holes; these are in twos, and are about one-eighth of an inch in depth, and probably were continued round the vessel. The rim is ornamented with oblique markings, as shown in the figure.

FIG. 11. From Princess Park.—Again the design is rocked on, after which the lines are made with the stylus.

FIG. 12. Seven pieces of this vessel were collected at Maquapit Lake by Mr. Duncan London. It is remarkable for the projecting rim, this being the only vessel in the collection with a rim of this description. The pattern has been stamped on with a toothed-indenting tool. The hole near the rim has been made after the pot was burned. Fig. 43 is a restoration from these fragments.



PLATE 2,



FIG. 13. From Maquapit Lake.—Is a rather neat design; the work of a toothed tool used as a stamp.

FIG. 14. Scalloped rims are rare, this small fragment from Princess Park being the best example in the collection. The scallop has been made by pressing down the clay in the furrow with a toothed-indenting tool, the top of each scallop being stamped with the same implement.

FIG. 15. In this fragment from Princess Park a series of small scallops has been made around the top of the rim by pressing down the clay with a smooth-indenting implement.

FIG. 16. This sherd shows one of the angular elevations so common on the vessels of the region. These rim-projections are shown in Plate IV, Figs. 45, 46 and 47. The ornamentation has been stamped on with a three-toothed indenting tool.

FIG. 17. Eleven fragments of this vessel were found at Princess Park. It is one of the most ornate designs in the collection, and shows the potter to have been a person of ideas and skill. Fig. 45, Plate IV, is a restoration from fragments of this pot. The lower part of the vessel was ornamented with a toothed rocker. Above this are parallel lines, which encircle the vessel, made with a toothed implement. The upright lines above these are the work of the stylus, which has also been used to ornament the top of the rim, as shown in the figures. The rim inside has been stamped with the rocker.

FIG. 18. From Jemseg.—The design on this sherd is almost the same as the last, except that three rows of indentations replace the perpendicular lines on the top of the vessel.

FIG. 19. From Princess Park.—An unusual design; the upright lines have been stippled on with the stylus or indenting tool.

FIG. 20. A Maquapit Lake fragment. The ornamentation is the work of a toothed implement three-fourths of an inch in width. The perpendicular ribbon-like markings are rocked on, while the central part of the design was made by using the implement as a stamp.

FIG. 21. In this fragment from Princess Park, the clay has

been rolled over to form a rounded lip, and stamped on the side and top with a toothed tool. Below the lip a series of oblique lines have been made with a toothed stamp.

FIG. 22. The design has been made by two stamping implements very much alike. The smaller, used in marking the parallel lines, was seven-toothed, five-eighths of an inch in width. The point where the imprints join may be plainly seen in the sherd.

FIG. 23. A Bocabec fragment, with a cord-like design made in the same manner as in Fig. 22.

FIG. 24. One of the most interesting pieces in the collection. Fourteen fragments of this vessel were found at Maquapit Lake by Mr. Duncan London. Fig. 46, Pl. IV, is a restoration of this vessel. Three implements were employed in producing the ornamentation. A small toothed stamp, one-fourth of an inch in width, was used in making the V-shaped design on the elevated portion of the rim. Joining this design a band one and three-fourth inches in width runs around and meets the V design on the opposite side of the pot. This band was made with a toothed implement. Below this the implement used in the V design has been used as a rocker in making a series of nearly perpendicular markings. The ornamentation is completed by a series of horizontal bands rocked on with a fine-edged tool nearly five-eighths of an inch in width.

Figs. 25, 27, 29, 30, 31 and 39 show some of the effects produced by the toothed-indenting tool rocked over the surface. Forms of this implement, as previously stated, were used either as a rocker or stamp in the decoration of almost every vessel, the fragments of which we have examined.

Figs. 26, 34, 35 and 40 are fragments showing effects produced by the toothed-indenting tool used as a stamp.

FIG. 32. From Princess Park.—Only two small fragments show markings, which may be cord imprints.

FIG. 33. An unusual decoration. The design has been marked with the stylus, after which a row of indentations have been made in the furrow.

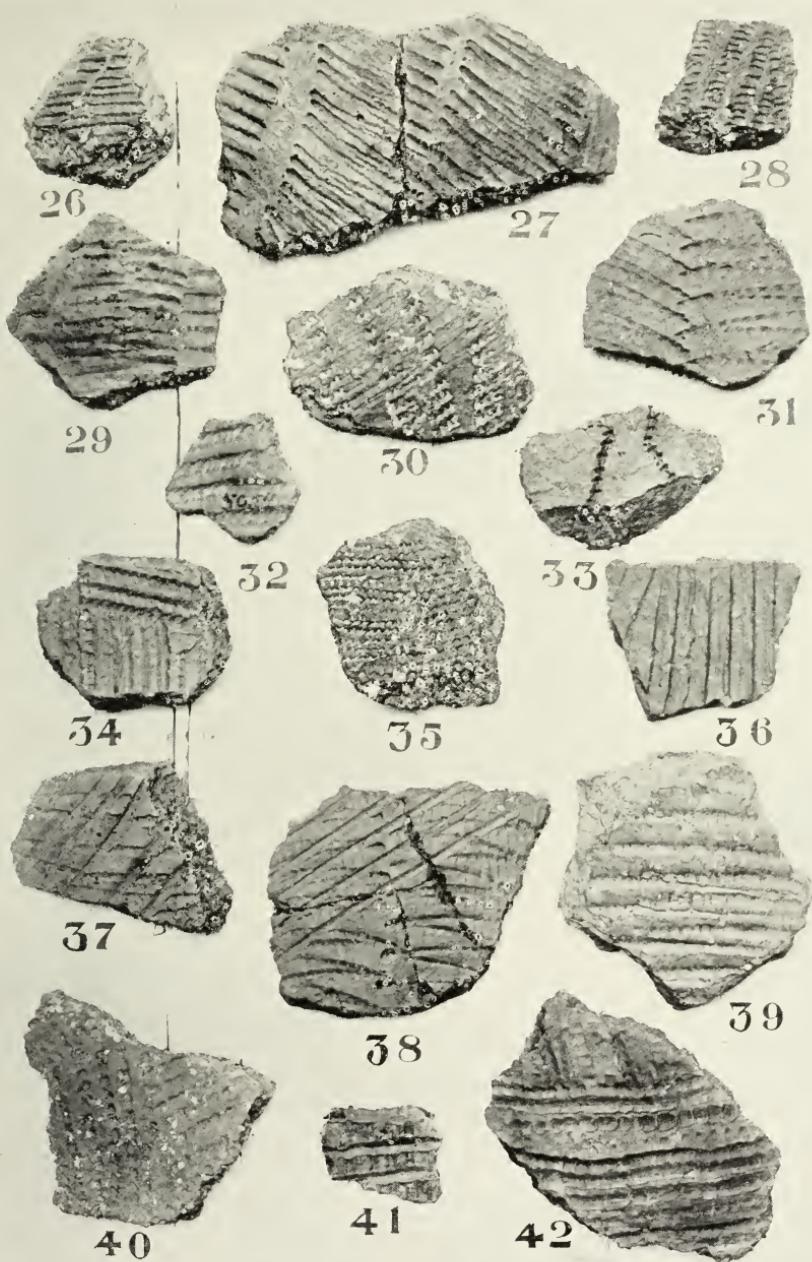


PLATE 3.



FIG. 36. A rare form of decoration,—a series of furrows made by the stylus, the potter working from right to left.

FIG. 37. In this Princess Park fragment a series of cross lines have been made by drawing the stylus over the surface.

FIG. 38. Many fragments of this vessel were found at Princess Park. A very fine grade of red clay has been used in its manufacture, and the workmanship is of the best. The vessel, although large, is very thin, scarcely a quarter of an inch in thickness half way down the side. The first part of the design has been made with a toothed rocker, after which the clay has been moistened and the ornamentation completed by making the parallel lines with the stylus. A number of fragments give evidence of water having been applied during the process of decoration. In several of these the initial design is faint and all scratches washed off. The faintness of the markings may be partly due to the clay being hard and not receiving the impress of the marking tool readily, showing that the surface needed to be re-moistened before completing the design. The obliteration of all scratches shows plainly the use of water, while the sharpness of the secondary part of the ornamentation is in marked contrast, and shows the potter was working on a wet surface.

FIG. 41. Small sherd from Indian Point. A series of incised lines, as shown in the figure, made by drawing the stylus across the surface.

FIG. 42. A fragment from Princess Park, which exhibits a style of ornamentation common on many of the larger and coarser vessels. The pattern has been stippled over with a four-toothed indenting tool. The work has been done carelessly; the lines are irregular, and the implement has been held in such a way as to make an uneven imprint. The first tooth has made a deep furrow, the second not so deep, the third a shallow imprint, while the fourth only touches the clay, leaving a faint impression. Restorations of some of the characteristic vessels of the region are shown in Plate IV.

FIG. 43 is a restoration from fragments illustrated and

described above. (See Fig. 12). The vessel was about eight inches in diameter and seven in depth.

FIG. 44. The sherds from which this restoration is made are remarkably thin, and made of a high grade clay; the surface is polished, and without ornamentation, except a row of indentations near the brim. The vessel was about six inches in diameter.

FIG. 45. A restoration from fragments illustrated and described under Fig. 17.

FIG. 46. Fig. 24, illustrates a fragment of this beautiful vessel. The ornamentation in this figure were made with an inked wooden stamp rocked over the paper or used as a stamp in the same manner, as the Indians must have used similar implements on the clay.

The writer has been able to re-produce exactly all the designs used on the New Brunswick potteryware, the only implements used being a variety of toothed tools for rocking or stamping, and a stylus.

FIG. 47. Is a very wide mouthed vessel, the entire decoration being made by a toothed rocker. (Restored from fragments).

Clay pipes which so frequently occur with pottery fragments have not been found in our explorations.

The writer knows of only one Indian clay pipe found in the province, and it is Iroquoian in type and may have been brought by a Mohawk war party.*

The writer is much indebted to Dr. and Mrs. E. Stone Wiggins, who gave permission to search for pre-historic remains in Princess Park, their beautiful estate on Grand Lake, and for the very kindly and cordial way in which they entertained and assisted the party while at Grand Lake during the summers of 1907 and 1909. Grateful acknowledgement is due Mr. Duncan London and Mr. David Balmain, whose assistance was of the greatest service, and also for the archæological collections they have from time to time presented to this Society.

*Described in Bull. of Nat. Hist. Soc. of N. B., Vol. IV., p. 297.

ARTICLE III.

PHOSPHATE DEPOSITS OF SOUTH CAROLINA AND NEW BRUNSWICK.

BY G. F. MATTHEW, LL.D., F.R.S.C.

Read April 6, 1909.

INTRODUCTION.

We have been told that "agriculture is the basis of a nation's wealth," therefore any thing that promotes it cannot but be of interest to a community such as this, which, no matter how large its interest in commerce and manufactures may be, is after all beholden to agriculture for its support and sustenance. It is this which has prompted me to ask you to listen this evening to a few words on some substances which help to give fertility to the soil, and wealth to the farmer, and an account of some mines where one of them is found.

In the manufactured fertilizers that are offered for sale in your midst, there are three substances which, above all others, gives value to these compounds; these are nitrogen, potash and phosphorus. Of the first named, there is an enormous, I may say an unlimited supply in the earth's atmosphere; but how to transform it from a gas, as it exists in the air, to a solid yet soluble substance, has exercised unsuccessfully the ingenuity of many a chemist; yet the solution of this puzzle is probably near at hand.

However, there is a source from which this stimulating plant food may be obtained by every farmer. It is now well known that the great group of plants called Leguminosæ (the Pea Tribe) have the power of absorbing nitrogen from the atmosphere and condensing it on their roots; hence, a field of clover or alfalfa, or field-peas, will draw into the soil from the atmosphere a quantity of this substance greater than the largest

application of fertilizer in ordinary farm practice will yield; an acre of peas has been known to add to the soil 139 pounds of nitrogen. So it is always possible for the farmer to return to the soil the nitrogen which repeated cropping has removed.

Of the second article I have named, there is an unlimited supply in the great areas of felspathic rocks to be found in New Brunswick. But though we know there are great quantities of potash salts in the crystalline rocks of the New Brunswick hills, we have not yet learned how to separate them, render them soluble, and so make them quickly available for stimulating vegetable growth. Hence, for supplies of this fertilizer, since wood ashes have become scarce, we are depending upon the ground slag that comes from ore-furnaces, on the deposits of potash salts in Chili and on "Kanit," which is the product of German mines, where potash is mixed with soda. These are all foreign, but we have a domestic source of potash in the ashes of sea-weeds which, in some countries, are largely burned for this product, and for producing other valuable chemical substances.

Now, of the third substance I have mentioned, namely, phosphorus, the world's supply is not on so liberal a scale as that of the two preceding. The phosphate industry of Canada in the "sixties" was in quite a prosperous condition. Large quantities were taken from the great veins of phosphate of lime, mingled with other minerals, that are found in the Laurentian region of the Ottawa valley. At Buckingham station and other points on the railway line near Ottawa many tons of it were to be seen in those days at the railway stations, being prepared and packed for shipment to market. You will ask, What has become of that industry? Well, for the time it has vanished! This is due partly to the difficulty of mining this ore, partly to the large proportion of it that is insoluble in its crude condition, but chiefly to the discovery of other sources of supply of phosphate that are more immediately available, or contain a larger proportion of phosphates in a soluble form.

One of these sources was opened up in the discovery of extensive deposits of the bones of vertebrate animals of a former age

that were deposited in the river valleys of South Carolina, and their exuviae in the phosphate rock of Florida and certain tropical islands. These were available by dredging the river channels in the Carolinas, stripping the beds buried in the flat lands that bordered these rivers, or, as in Florida and the West Indies, quarrying a soft rock that was found comparatively near the surface.

Having seen the bones of gigantic early Tertiary mammals and fishes that had been taken from the Carolina phosphate beds, I had been under the impression that these beds were of Eocene Tertiary age; but a study of their relations *in situ* show them to be much more recent. They probably contain the remains of animals of various ages promiscuously mingled, rolled in the sea, and re-deposited in late Tertiary beds.

EXCURSION TO PHOSPHATE MINE ON THE STONO RIVER.
(March 17, 1908).

Through the kindness of Prof. Paul M. Rea, Mr. Henry P. Williams, of Charleston, placed his motor yacht at our service for the excursion, and we started for the mine at 1 p. m. The party consisted of Prof. Rea, Mrs. Rea, and two of Prof. Rea's geological students, Mr. Williams, owner of the yacht, Mr. Law, a visitor from the north, Mrs. Matthew and myself. We started from near the Battery at the south end of the city, and steered diagonally across the Ashley River to a creek (Wappoo Creek, or Cut), that is part of the inland waterways along the coast. This Creek had been straightened and deepened by the United States Federal Government to connect the Ashley River with the Stono River to the south. The latter river is one on which some of the principal phosphate mines are situated, and the third of these above the point where we entered the river was our objective.

On the way up the Stono River we enjoyed the beautiful scenery characteristic of that region. On the immediate borders of the river are low marshy meadows, diversified here and there

by low swells of land which come down to the banks of the stream in broken banks of yellowish or whitish clay covered by a wild shrubbery, or crowned with the cabins of the negro occupants of the cotton plantations which are situated on these swells of drier land. This is the region of the famous sea-island cotton, a long staple variety, which brought much wealth to the planters in the old days of enforced labor, and still is planted with profit.

Occasionally in the distance could be seen fine groves of pine or of live oak, or of deciduous trees which are scarcely yet putting on their clothing of leaves. On nearer approach though, we found indications of the opening spring in the yellow blossoms of the jessamine, the flowers of the shad-bush, or the more showy petals of a trailing bramble; these serve already to make the thickets attractive.

The tide being low, we had some difficulty in making the wharf of piles with a light plank covering, which served at this mine as a convenience for landing coal and other supplies, and for shipping the phosphate rock. Landing here we found the buildings of the mine, and near by a locomotive awaiting to convey us to the scene of operations, where the digging of the phosphate was going on. This engine conveyed us for a mile or so down along the side of the river, across broad flats, over much of which digging operations had been carried, resulting in widespread distribution of the coarse refuse of the phosphate beds, and the burial of the original peaty deposit, which in the lower lands along the river forms the natural surface.

The overseer or manager of the mine said that the "overburden" where they were working was rather heavy, being about twelve feet. There is a thickness of four or five feet of peat, then a bed of a foot or two with marine shells (oysters, etc.), then several feet of clays and sands, and finally the phosphate bed, containing marine shells, with bones of whales, teeth of sharks and bones of a number of land mammals, as mastodon, elephant, sloth, deer, horse, etc., all promiscuously mingled together, the result of a breaking up and commingling of deposits of various ages. Scattered through these are great numbers of

phosphatic nodules, of all forms and sizes, many of which show casts of the interior of bivalve shells, which have perished, leaving only this reminder of their former presence.

It is interesting to see the great steam scoops at work removing the covering of the phosphate beds and transferring it to the adjoining land, first the peat and then the underlying clay and sand; then, when the phosphate bed is uncovered, the negro laborers go to work, with pick and shovel, to loosen up the masses of phosphate and bones and transfer them to great buckets or cages that are lowered into the trench by a steam crane. When the bucket is filled, the steam crane lifts it, swings it over to a train of cars and dumps it, filling car after car until the train load is completed. Then the cars are carried off by a locomotive to the washing house at the side of the river, where we had landed. Here the cars are taken up singly along a long incline to the top of the washing house, where the sludge and waste is separated and the lumps of phosphate purified. This is done by a revolving cylinder, with the further end raised, and having a spiral ridge upon it that carries the phosphate continually forward. The phosphate falls upon this cylinder through a hopper from the car, and with a heavy stream of water the impurities are washed out. After being thus washed, the phosphate nodules are carried to a calcining house, where they are dried and calcined by means of wood fires built under them; after which they are ready for shipment to the phosphate factory, where they are ground, treated with chemicals, and mixed with other fertilizers and put on the market as superphosphates, and preparations for particular crops.

About a week after this visit to the Stono River, when on our way up the Ashley River to Magnolia Gardens, we passed two phosphate dredges at work dredging phosphate from the bed of the Ashley River. One of these dredges was built on the principle of the steam dredges that are at work in the harbor of St. John. The scoop, after lifting the charge from the river bed, discharged it into a large hopper on the side of the dredge, where a heavy current of water washed away the mud; the material

was then passed over a revolving cylinder, where it was further washed and the phosphate gravel separated from the stone. The other dredge appeared to work an Archimedes screw or some such device that brought up the mud; it was raised to the revolving cylinder, where a separation of the mud and gravel was effected, as in the other dredge. The phosphate was culled and separated from the stone, as in the previous case.

LOCALITIES FOR PHOSPHATE OF LIME IN NEW BRUNSWICK.

These are few, but are of interest, as compared with similar deposits in other parts of the world.

A deposit occurs in a bed of fossil shells (*Lingulella*), two or three inches in thickness, that occurs in the sandstones at Dunn's Ledges, on the east side of Courtenay Bay, at its head. *Lingulella* shells are largely composed of phosphate of lime, and if they were in sufficient quantity might form an available source of phosphate; but the bed is too small to be economically available.

Another locality known to me is at Hanford Brook, in eastern St. John County. Here it occurs in scattered nodules in a bed with Cambrian fossils, and was collected by Messrs. W. D. Matthew and G. Van Ingen, when studying the Cambrian fauna of that place. The occurrence is very similar to that in the phosphate deposits of South Carolina, where we find fragments and casts of Tertiary bivalves; just as at Hanford Brook the phosphate nodules are replete with the detached parts of the trilobites of the much earlier Cambrian Time.

These phosphate nodules in the sandy shales of Hanford Brook did not seem to me to be in quantity sufficient to be available for the manufacture of fertilizers.

ARTICLE IV.

OBSERVATIONS ON WEATHER AND PLANTS, 1908-9.

BY DR. G. U. HAY

Ingleside, May 4, 1908.—The cold backward weather of March and April was relieved by a few spring-like days during the last week in April. Few signs of vegetation yet. Flowers of red maple and leather-wood (*Dirca palustris*) appearing; flower buds of round-lobed hepatica opening; the mottled leaves of the fawn lily (adder's tongue) showing in sunny places; a few ferns (*osmundas*) pushing up their woolly fronds, and the catkins of alder and willow elongating.

St. John, May 7.—Coltsfoot (*Tussilago farfara*) well in bloom, and a few white violets appearing in sheltered places in Rockwood Park. On the 11th, a fine warm day, a few flowers of red maple, fawn lily, fetid currant, Labrador violet in bloom. White violet and coltsfoot abundant. Red-elder buds bursting. A red-cherry tree broken by the storms of winter was in haste to put forth leaves and blossoms, while the upright trees of the same species were still in bud!

Ingleside, May 15.—Arbor Day. Planted cherry-birch, white-ash, red-ash, ash-leaved maple, ironwood, American hornbeam, Siberian pea-tree, and others. A pleasant day and comfortably warm. White violets and fawn lilies in full bloom. Ploughing began on the 16th; on drier lands earlier.

May 17.—Found the following plants in bloom: Dandelion, strawberry, mountain-fly honeysuckle (*Lonicera ciliata*), gold-thread, a few blue violets in sunny places. The leather-wood shrub a mass of bloom, and the red-maple crimsoning the woods everywhere. The fetid-currant has been in full leaf for more than a week past. (This is our first shrub to come into leaf). A few small red-cherry shoots are in leaf on sunny hillsides.

The spicy fruit of the checker-berry (*Gaultheria procumbens*) form bright red clusters of berries on dry wooded hillsides.

May 19.—Flower and leaf-buds of amelanchier bursting. First potatoes planted.

May 20.—Leaves of poplar (*Populus tremuloides*) expanding in open sunny places; first white trillium (*T. grandiflorum*) unfolding; bellwort (*Uvularia sessilifolia*) and wood anemone in bloom.

May 30.—During the past ten days the buds on the trees have expanded into leaves, except on the oak, acacia, great-tooth-leaved poplar and black walnut, which are later than the others. The rhodora, the earliest of the heath plants to bloom, is beginning to enliven the bogs and waste places with its rose-coloured petals. Yellow and blue violets; the white, painted and purple trilliums; clintonia, cornus and blueberry; the wild red cherry—all in full bloom. The petals of the amelanchier trees, which have been the glory of the woods for the past ten days, are beginning to fall. The buckbean (*Menyanthes trifoliata*) is unfolding its bearded petals, and a few pyrus (*Siberian crab*) buds are bursting into bloom.

June 7.—All the trees have unfolded their leaves except the acacia, and very beautiful they look in their fresh foliage. The yellow lady's-slipper is in bloom, and a few blossoms are appearing on the Siberian pea-tree, the red-berried elder and the purple clematis. A large crab-apple tree on a neighbouring farm was a mass of bloom yesterday (June 6). To-day the petals are beginning to fall. Stemless lady's slipper in bloom.

June 16.—There has been interrupted fine weather for more than a fortnight, giving farmers a fine opportunity to get in their crops. There was a slight frost on the night of June 2nd, but the temperature on some days has been unusually high. The lilacs, which began to burst into flower on the 8th, are now a mass of bloom. To-day there is a refreshing down-pour of rain.

June 22.—Marsh violet (*Pinguicula vulgaris*) and Rosa

rugosa are in bloom. Ripe strawberries first observed yesterday, though reported a week earlier from up-river.

July 3.—*Acacia (A. viscosa)* in bloom.

The remainder of July was alternately fine and showery. August was a fine-weather month, with but little rain. A slight frost September 4th and the night following; again on September 23rd. The month was very dry and warm, with numerous forest fires, which were quenched by an abundant rain on the 29th,—the first of any consequence during the month.

The month of October and the greater part of November were fine with many perfect days, peculiar to this season. The autumn foliage was more than ordinarily beautiful. The first severe frost of the season occurred on the night of October 4th.

May 5, 1909.—The past winter has been exceptionally fine, with no extremely cold weather, and with occasional light falls of snow. The month of April was generally wet and cold, continuing so during the early part of May. Farmers began ploughing May 4th.

May 13.—Leather-wood, red maple, white violet, blood-root, fawn lily in full bloom in open places. *Trillium grandiflorum* with white petals showing. A few blue violets in bloom in sunny spots.

May 20.—Flowers in bloom: *Trillium grandiflorum*, bluets, blue violets, 'hobble-bush (*Viburnum lantanoides*), gold-thread, mountain-fly honeysuckle. Purple and painted trilliums just coming in bloom. Great abundance of catkins on white birch trees. Trees and shrubs in leaf—small white birches, cotoneaster, pyruses, elder.

May 21.—Heavy frost last night, with ice in low places, and again on the night of the 24th, killing tender garden plants just above the ground.

May 24.—Dandelions, strawberry plants and a few amelanchiers in bloom.

May 29.—An abundant rain, the first for several weeks. The grass and trees felt its influence immediately, and the soft spring verdure diffused itself as if by magic over the landscape. The amelanchier and hobble-bush in bloom everywhere, whitening the woods. In flower—the nodding wake-robin (*Trillium cernuum*), wood-anemone, red baneberry, bellwort; and coming into bloom in open places—*Cornus canadensis*, *rhodora*, wild red cherry. In leaf—lilacs, ironwood, beach, Siberian pea-tree, birches, maples, honeysuckle, mountain ash, horse chestnut, amelanchier. Oak buds opening and the downy silver and gray leaves of the great-tooth-leaved poplar just unfolding.

June 1.—Heavy frosts on the nights of May 31st and June 1st, with ice in low places.

June 8.—The weather has been dry, with bright sunshine, for the past week, and cool. Forest fires prevail in different parts of the province. In bloom—Siberian pea-tree, the pyrus, wild red cherry, *rhodora*, striped maple, purple clematis, stemless lady's slipper, yellow lady's slipper. The large crab-apple tree on a neighbour's farm coming into bloom. (Sunday, June 6) now in full bloom. The trees in full foliage, except acacia, black walnut and eleagnus.

June 10.—Forest fires still continue, and the air is filled with smoke.

June 19.—Mountain-ash and horse-chestnut in bloom.

June 22.—A heavy rain and hail-storm this afternoon, accompanied with severe thunder and lightning. Hail stones three-fourths of an inch in diameter, and irregular, jagged pieces much larger fell in abundance doing considerable damage to young fruits and the leaves of trees. Hail stones unmelted lay on the ground in sheltered places for four or five hours after the storm.

June 28.—The weather has been variable during the past fortnight, with alternate hot and cool days. The abundant rains have put out the forest fires, and have brought on the growth of the grass and crops very rapidly. The showy lady's slipper (*Cypripedium hirsutum*) in bloom.

July 3.—Weather still continues cool, with rain to-day. A fire is very comfortable.

September 27.—The past summer has been cool, with but few hot days and considerable rain. Ten days of fine warm weather about the first of August gave farmers a good chance to get their hay crop. Those who did not avail themselves of it suffered, as there was little continuous fine weather afterwards. There were some light frosts during the month, including the night of the 12th, but no damage was done. From the 19th to the 24th the weather was balmy and beautiful. From the 25th to the 28th there were constant and heavy warm rains, which, in addition to what had previously fallen, soaked the ground, raised the streams, and made a fall freshet of unusual height. Much hay was spoiled by the flooding of the marshes.

October 26.—The month of October was like September, with generally high temperature and much rainy weather, a few very fine days and occasional light frosts. There was a week of uninterrupted fine weather between the 3rd and the 10th, with some very warm days. The temperature on the 8th at 3 p. m. was 70°F., and on the 9th it rose to 77°, almost as hot as the hottest days during the past summer. On the night of the 19th the heaviest frost of the season occurred, but only sufficient to make thin ice.

The autumn foliage was much less brilliant and varied than usual, owing, perhaps, to the abundant moisture and continuous warm temperature. In consequence the leaves kept their green colour and remained longer on the trees than usual. An exception must be noted in the leaves of the white birch (*Betula alba* and its varieties). These withered and fell early, owing to the ravages of a small beetle (*Bucculatrix canadensiella*), which, though doing conspicuous injury to the leaves, has done no serious damage to the vitality of the trees thus affected.

November 15.—The weather during the first half of November has been a repetition of that during the last part of October, with pleasant days and frequent rains. Dandelions were in bloom as late as December 7th.

ARTICLE V.

NOTES ON NEW BRUNSWICK WEATHER FOR 1908.

By D. LEAVITT HUTCHINSON.

January.—The weather in New Brunswick was unusually fine and mild. Rain or snow fell on nine days, two days were wholly clouded, and there were twenty days of bright weather. The wind velocity was exceptionally high, and gales were recorded on the 4th, 5th, 6th, 7th, 12th, 15th, 16th, 17th, 19th, 20th, 23rd, 27th and 28th. Temperatures below zero were registered on the 15th, 19th, 20th, 30th and 31st, the intervening periods being remarkably mild. Thunder occurred on the 22nd and 27th. The snow covering was light in all districts, with bare ground during the greater portion of the month in southern New Brunswick. The last day of the month was the coldest of the winter. The highest temperature was 54 at Sussex on the 8th; lowest, —15 at Dalhousie on 31st.

February.—The weather of the month was about equally divided between fine and unsettled days. The snowfall was light, and varied much with the locality, the precipitation being as snow in some districts and as rain in others; at no time was the snowfall normally deep in any portion of New Brunswick. From the 1st to the 10th the coldest weather of the winter was experienced, when below zero temperatures were of daily occurrence, except on the 2nd and 7th. The remainder of the month was comparatively mild. An unusually severe storm prevailed along our coast on the night of the 1st and the morning of the 2nd; in the Bay of Fundy the wind reached hurricane force, accompanied by snow, rain and abnormally high tides; wharves and breakwaters in many parts were badly wrecked, and some damage occurred on shore. The wind during this gale was from the southeast to southwest, with velocity of 84 miles per hour at Point Lepreau. Gales were also reported on the 6th,

15th and 19th, but they were not very severe. The maximum was 54 on the 15th at Sussex, and the minimum, —29 at Fredericton on the 4th.

March.—The weather during March was generally mild, although temperatures below zero were recorded occasionally. The precipitation was generally less than average. Moderate gales occurred on the 7th and 10th, and there was a fresh gale in the Bay of Fundy on the 26th. The snow covering was light in all districts, and the ground was bare in southern localities after the 14th. The highest temperature, 53, occurred at Chatham and St. Stephen on the 24th; lowest, 15 at St. Stephen on the 6th.

April.—April was cold, backward, and, for the most part, quite wintry up to the 21st, then fairly warm and spring-like, with a marked warm wave on the afternoon of the 27th, giving temperatures upwards of 75° . In some places snow still remained in the woods, and to a considerable depth locally in the interior and on the north shore. Vegetation was backward; rivers and streams were unusually late in opening. Snow fell on the 2nd, 21st, and heavily on the 8th and 9th. Rain fell heavily on the 28th. Local thunderstorms on the 26th. Highest temperature was 77 at St. Stephen on the 26th; lowest, 5 at Dalhousie on the 4th.

May.—The first ten days were dull and cool, with rain on the 1st, 3rd and 8th. A heavy thunderstorm occurred on the 12th, and was followed by a period of mostly fine, and, at times, warm summer-like weather, which continued up to the 25th. The remainder of the month was cool, dull and wet. Vegetation at the end of the month was well advanced. The month closed with southeast to southwest gale, with velocity of forty-eight miles an hour in the Bay of Fundy district. Maximum temperature, 84 on the 20th at Chatham; minimum, 23 on the 5th at Dalhousie.

June.—A month of fine weather. More than half of the light rainfall fell on the 16th. Temperature was above the

average, but there were no days of excessive heat. Bright weather was general, with few coast fogs. Vegetation made remarkable progress everywhere, and the outlook at the end of the month was most encouraging. Highest temperature was 94 on the 9th at Chatham; lowest, 25 on the 2nd at Dalhousie.

July.—The first two weeks were exceptionally dry, fine and warm. Temperatures of over 90 degrees were frequently registered in the interior and northern districts. From the 15th to 23rd the weather, for the most part, was dull, wet and cooler; nearly the total rainfall of the month was recorded during this period. The remainder of the month was fine and dry, but not so warm as first half. Severe thunderstorms occurred locally, and considerable damage from lightning was reported. Forest fires were destructive during the dry period. Fogs near the coast were light and infrequent. Maximum temperature, 96, occurred at Chatham on the 7th; minimum, 37 at St. Stephen on the 16th.

August.—Compared with the two previous months, the weather of August was wet and cool, while about half the month was fine; the seasonal warmth was deficient. Up to the 18th rain fell on twelve days, after that date the only rainfall was recorded on the 23rd. No gales occurred, and the few local thunderstorms reported were unimportant. The highest temperature, 84, at St. Stephen on the 14th; lowest, 30 at Bathurst on the 22nd.

September.—A phenomenal month for warmth and drought. In no other September on record has there been so small a rainfall or continuance of weather so fine and warm, excepting the 20th, when below freezing was recorded in a few localities, summer temperatures generally prevailed. The dry spell was exceptionally long, rain only falling lightly on six days since the 18th of August. Water in the St. John River and its tributaries was abnormally low, and in many districts brooks and wells were dry. Forest fires were extensive and most destructive, smoke frequently being very dense in all parts of the province. Maximum

temperature, 87, was recorded at St. Stephen on the 10th and 26th; minimum, 27 at Sussex on the 19th.

October.—The remarkable period of fine, warm and dry weather continued through October. The total rainfall of the month was practically all recorded on five days. Temperatures were much above the average, with a marked absence of killing frosts. Moderate gales occurred on the 3rd and at the close of the month. Light snow fell on the 30th. The highest temperature was 77 at St. Stephen on the 17th; lowest, —16 at Sussex on the 21st.

November.—The extremely light rainfall of the month occurred at frequent intervals in small amounts, except on the 12th and 15th, when nearly two-thirds of the total fall was experienced. Snow fell generally on the 18th, giving a brief period of sleighing in some localities. Between the 18th and the 21st the first fairly low temperatures were recorded, otherwise comparatively mild conditions prevailed; on the 30th rivers and streams were free from ice. There was a moderate northwest gale on the 12th, and a moderate to fresh gale from southwest to northwest on the 15th. There was faint lightning during the early morning of the 27th. Highest temperature, 56, at Grand Manan and Moncton on the 4th, and at Sussex on the 26th; lowest temperature was 12, and occurred at Dalhousie on the 30th.

December.—December weather was noticeable for its rapid temperature changes, excessive cloudiness and frequent falls of rain or snow. Gales from the northwest on the 2nd and 3rd, southwest on the 4th, and southeast on the 7th. In southern New Brunswick sleighing was fair during the last two weeks, the snow at the close of the month ranged from one inch near the south coast to two feet in the woods of the northern districts. Maximum temperature, 58 at St. Stephen on the 1st; minimum, —20 at Fredericton on the 23rd.

ST. JOHN OBSERVATORY.

WIND DIRECTION AND VELOCITY FOR 1908.

MONTHS.	1908		N.		N. E.		E.		S. E.		S.		S. W.		W.		N. W.	
	Hours.	Miles.																
January.....	56	556	58	685	6	41	54	1,210	30	601	135	2,640	92	1,022	304	6,049	9	12,804
February.....	94	930	60	494	29	248	69	1,411	30	386	109	2,144	47	468	268	3,947	0	10,028
March.....	91	892	100	939	35	390	59	925	51	735	122	2,415	42	416	240	3,638	4	10,350
April.....	56	608	28	308	39	394	44	607	99	1,032	139	2,243	51	602	261	5,971	3	11,765
May.....	61	615	73	651	98	936	96	1,309	188	1,442	141	1,790	10	49	75	823	2	7,615
June.....	53	500	75	753	12	77	64	605	201	2,803	98	1,435	14	103	103	1,745	0	8,021
July.....	38	310	80	816	19	70	76	504	341	2,439	108	1,255	27	188	50	359	5	6,121
August.....	56	480	60	565	19	75	102	1,106	257	1,750	121	1,640	21	129	92	1,125	16	6,870
September...	61	641	64	638	6	23	50	478	264	2,025	123	1,418	38	190	98	1,157	16	6,570
October.....	74	654	67	750	37	290	74	733	115	707	158	1,725	47	324	153	2,655	19	7,718
November...	48	418	64	710	48	418	48	703	35	451	118	1,904	99	1,322	259	4,985	3	10,911
December...	128	1,211	64	642	15	113	64	1,298	33	730	69	1,088	63	723	309	5,608	1	11,413
TOTALS....	816	7,815	793	7,951	363	3,075	796	10,889	1,744	15,101	1,441	21,697	551	5,536	2,202	38,122	78	110,186

METEOROLOGICAL ABSTRACT FOR 1908.

ST. JOHN OBSERVATORY.

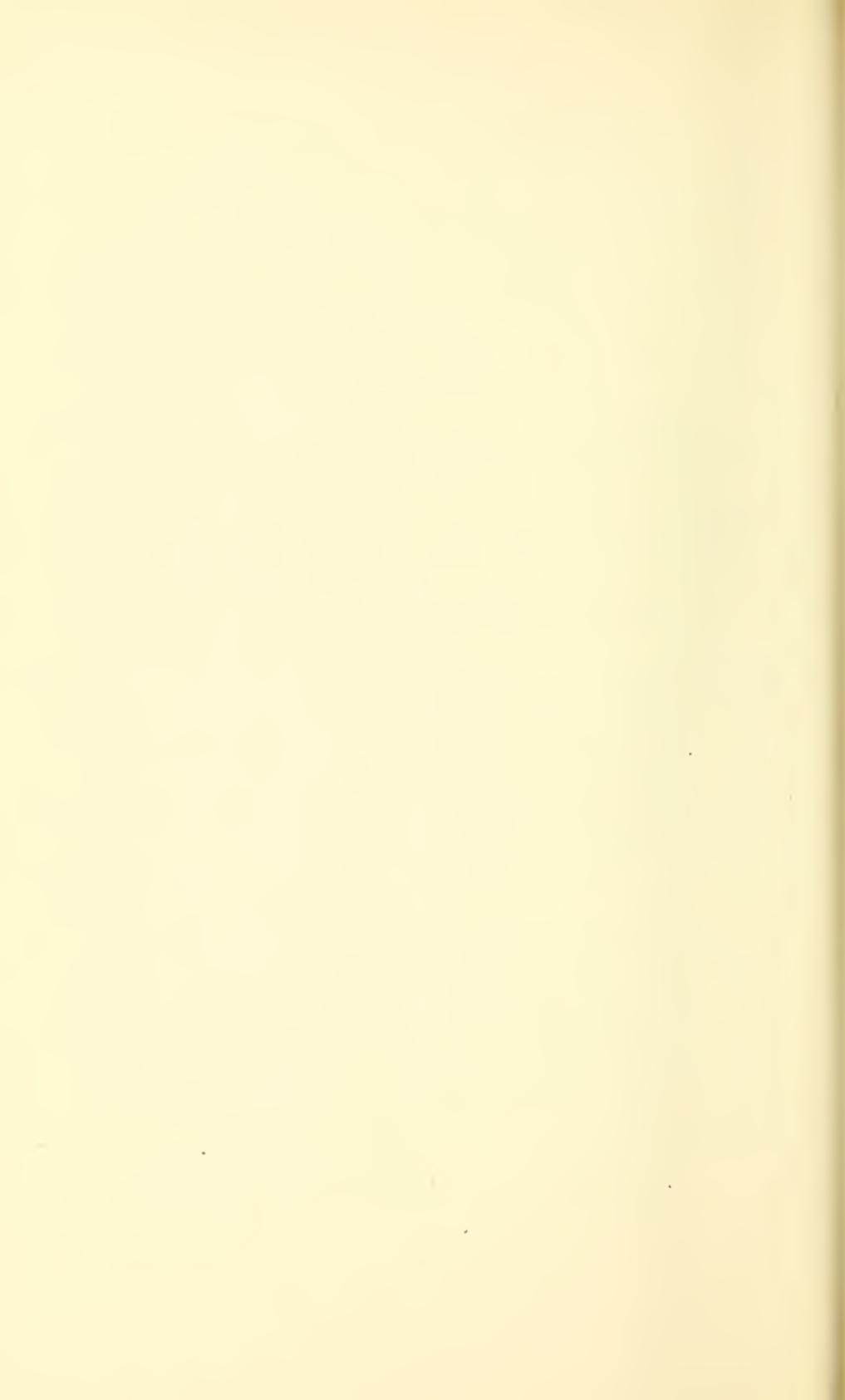
METEOROLOGICAL SERVICE OF CANADA.

Latitude, $45^{\circ} 16' 4.50z$ N.Longitude, $66^{\circ}, 3' 49.50z$ W.

MONTHS 1908.	BAROMETER.			THERMOMETER.			Cloudiness. 0=Clear. 10=Wholly Cloudy.	Precipitation Rain and Melted Snow.	Thunder Storms.	Fogs,
	Mean	Highest	Lowest	Mean	Highest	Lowest				
January,...	29.857	30.487	29.026	23.5	49.8	- 9.4	5.5	4.48	1	1
February,...	30.002	30.712	29.006	21.0	50.0	-13.2	5.1	2.77	0	5
March.....	30.048	30.450	29.270	28.1	48.4	- 1.0	5.5	3.78	1	4
April.....	29.786	30.440	29.046	36.3	63.6	12.0	5.1	3.23	1	4
May.....	29.960	30.535	29.305	50.1	74.2	34.2	6.5	4.08	1	7
June.....	29.974	30.366	29.626	57.1	78.7	35.0	5.1	2.43	1	5
July.....	30.008	30.349	29.533	64.3	84.5	49.5	5.8	2.93	2	11
August....	30.005	30.338	29.561	61.1	76.2	47.2	5.2	5.21	3	7
September.	30.046	30.401	29.591	58.2	77.0	39.2	4.2	1.20	1	5
October....	30.087	30.559	29.110	49.9	68.2	30.0	4.6	3.60	0	7
November.	29.873	30.478	29.244	37.9	54.5	21.5	6.6	1.84	0	1
December..	29.929	30.637	29.011	24.2	50.2	- 4.3	5.5	4.94	0	2

Mean height of barometer for year was 29.965, the highest reading 30.712 on 10th February, and the lowest 29.006 on 2nd February. The mean temperature for the year was 42.6, which was 1.7 above the average for the past 36 years. Maximum temperature 84.5 on 6th July, and minimum -13.2 on 5th February. Total precipitation 40.49 inches; was 5.81 inches below the average. The first frost occurred on 13th October and the last on the 22nd of April.

D. LEAVITT HUTCHINSON,
Director St. John Observatory.



APPENDIX.

THE PRESIDENT'S ANNUAL ADDRESS.

The President began by a reference to the constitutional provision that on the night of the annual meeting his address should be delivered. Naturally enough there was no provision as to the character of the address, but it was reasonable to assume that some important subject should be considered, that it should be carefully weighed according to scientific principles, and examined in the light of the latest scientific knowledge. This evening he would not attempt anything of that kind, for he could reasonably plead, as an excuse, a summer of earnest work in other directions; and the few observations which he would make were along very simple lines. He said:

I have often wondered whether we, as a Natural History Society, could take the lead, or, indeed, any part in a movement for the preservation of the natural inhabitants of our woods and waters. Perhaps there may be question whether, in any case, anything of this kind is needed, that is to say, whether there is any sound reason for allowing shelter to bears, wild cats, mink and the like among our animals; to eagles, osprey, cormorants, and their kin among the birds. I do not mean by mentioning these particular animals and birds to limit in any way the scope of the protection of which I am thinking, which is, in a general way, a protection that would really amount to the preservation of all the forms of animal life that roam or hide in our woods, of all the birds that fly the trees or that haunt lakeside or river bank, of all the fish that are along our shores or in our inland waters. I confess that while I may not have absolute sympathy with the bear, which threateningly obstructs my way on a country road, and while I might be quite ready to kill him at sight, I

hate to sit down and think that he may be the last of his race, and that with his death the tribe or family of which he is a member will utterly perish. We have undertaken, in a certain sense, the protection of some of our forest dwellers; but this is not done because we recognize any right of others to live, but that we may kill them in such a systematic manner that the revenue derivable from them shall be permanent and enlarging. This reference is chiefly to moose and deer. In the past few years it has become a custom of the press to record every moose that falls before the hunter's rifle, to tell us what a lordly animal he was, how noble his proportions, how great the spread and how many pronged his horns. I daresay that many of you who read of this fine animal's death are touched with sympathy at his fate. It could not be otherwise. He is decoyed by a sound which seems to him the wooing of his mate, he comes within range of the rifle of his concealed foe, and is usually shot down without any opportunity whatever of defending himself against his assailant. Practically he has no chance of escape. On several occasions hunters have told me that, eager as they were to secure a trophy of these moose-hunting expeditions, they felt sorry for the life they had taken. A few years ago I met on the Tobique river a clergyman, who informed me that he was a pretty regular annual visitor to that beautiful stream. "Last year," he said, "I shot my first moose, and it will be the last, for I felt sorry as soon as it was done. I might as well have shot a cow in the open field." He was not, therefore, of the ministerial type described by the New England poet:

The Parson, too, appeared, an man austere,
The instinct of whose nature was to kill,
Whose favorite pastime was to slay the deer
 In summer on some Adirondac hill;
E'en now, while walking down the rural lane,
He lopped the wayside lillies with his cane.

Of course I must be moderate in my observations, for I observe that ladies have taken to the woods as moose hunters; recently I read that it was becoming a custom for young married people to spend their honeymoon in personally endeavoring to

secure horns of the moose for the adorment of their homes. Somewhat similar observations might be made in regard to deer hunting. The other day I read a newspaper paragraph describing the killing of a white doe, which, according to the glowing description of the circumstance, somebody was "lucky" enough to shoot. Possibly the shooting of the white doe somewhat jars upon one's poetic sensibility. The white doe abounds in our romance literature, usually as the symbol of gentleness and of purity, and ought, in fancy at least, to be as free from molestation as the lily white maid. I would like to believe that the white doe is as sacred as the white elephant in Siam, and to imagine that the reverence paid to this last originated in the thoughtful mind and tender heart of some S. P. C. A. organized in the dim and distant past, who, moved by the strange beauty of the white elephant, invented the idea of its sacred character in order to save it from being a common beast of burden.

Now I know very well that in these observations I am upon ground which may be easily criticised. I confess to a desire to go fishing occasionally; and I have eaten partridges. We are not vegetarians, and the flesh which we eat is procured only at the cost to the animal of its life. It is not material to the moose after what manner he is slain, and, perhaps, if he could have a choice, he might prefer the rifle ball to the rougher method of the slaughter house. Then, again, it is proper to note that our legislation in recent years has reduced considerably the indiscriminate killing of these animals. A general ownership is now recognized in them, which is placed under legal regulation; a greedy hunter, who over-shoots the number allowed him by law, is punished by fine, and, generally, there are conditions which are much better than those which existed a few years ago. But whether the moose is increasing in numbers, or whether he is being driven from his forest home to the open, is uncertain. When, however, one does appear among us, we might allow him or her some better treatment than is given. The newspaper statements of the way in which the unfortunate animals which come within the range of our civilization are treated are really

saddening. It was something of a grim satire upon our hospitality that one unlucky animal, which recently came within the city limits, was so ill-treated by the thoughtless crowd that it sought refuge in the burial ground, and there died from the harsh treatment which it encountered. And this brings me back to the point from which I started, viz., that we do not recognize sufficiently the just rights of many lovely things. I was told the other day of a small family party which went into the woods for a day's pleasure. They camped at a spot often resorted to, and there a squirrel had its home. The little animal, quite unafraid, came out of its own residence and greeted them, apparently with pleasurable anticipation of some dainty morsel when the lunch was spread. A boy in the group threw at it a stone with too good aim and killed it—the mother of a family too young to do without a mother's care. No doubt the act was a thoughtless one. The result materially affected the day's pleasure of that party; but, what was worse, it unjustifiably deprived of life something that had a right to live. Could that or some similar idea or feeling he made a living force operating upon human conduct? A few days ago I read in a Connecticut newspaper a paragraph to the effect that a man living near a town in that state had discovered on his farm the hoard of chestnuts gathered by two red squirrels for their winter's provision, and had confiscated it. Possibly this man acted without much thought, but surely it was a dishonourable and mean thing to rob the squirrels of their winter's provisions, the result of their indefatigable industry, particularly as the season for collecting a fresh supply is over.

Within the range of observation of each one of us, there are many things which call us to keener and closer thought upon Life than perhaps we ordinarily give it. Whence comes it? What is it? Whither goes it? What power originates it? What controls it? Whether it is created by some primal law of matter or is the beneficent act of the Almighty Father, is it not a sacred thing? I need not enter upon the vast field of thought which these questions awaken. But the man must be

heedless, indeed, who sees life go and come without thinking that there is a Being to whom we may be responsible, in some degree, for our attitude towards all that He has created.

What has been said in regard to the four-footed tribes applies as well to the birds; more strongly to the birds than to the animals for, to a large extent, those beautiful productions of nature—a great many of them—are dependent upon us. They are visitants which, in their season, place themselves under our protection, and work for their daily bread about our homes, our gardens, our farms. The most beautiful birds are rarely in the deep woods or on the wild places; but in the easy observation of almost all of us are

The ballad singers and the Troubadours,
The street musicians of the heavenly city.

The demands of fashion have greatly endangered the lives of all kinds of birds. Our ornithologist, Mr. Leavitt, has frequently reminded us of this important fact. The evil in the United States had become so great that Audubon societies have been formed for the protection of wild birds and animals, and these are united in a national association, which is to hold its annual session in New York this day week. A title of one paper to be discussed is "The Trail of the Plume Hunter," and perhaps I need not do more than mention this fact in order to put plume *wearers* on their guard. The Audubon movement in the United States has become so influential that it has moved the national administration of that enlightened country to provide federal reservations of public lands in all the states in which the government owns lands, upon which reservations there is protection of the bird life, according to rules carefully made, and carried out under efficient inspection. In August last President Roosevelt, by proclamation, established three of these reservations, one of them in Florida which includes almost all the islands in the Key West region, one in California and one in Oregon, and these will considerably enlarge the scope of a most excellent work. That he has been given the power to make these reservations is ample evidence of the existence of a feeling that man has a duty

to perform in relation to the animal world. Because we have invented guns is no evidence whatever of our right to indiscriminate slaughter of animal life. That slaughter is all too easy by reason of the cheap price at which guns may be procured—a condition which is helping to create a large army of undisciplined hunters, a dangerous force of deer-slaying guerilla, who are, by the way, as apt to kill each other as the animals they are hunting. So far as the birds are concerned, their destruction is a short-sighted and a dangerous proceeding. You all remember the Poet's Tale in Longfellow's Wayside Inn collection, "The Birds of Killingworth." The beautiful spring had come, the purple buds were expanding, the rivulets, rejoicing, rushed merrily on and burst into great streams.

The robin and the blue-bird, piping loud,
Filled all the blossoming orchards with their glee;
The sparrows chirped as if they still were proud
Their race in Holy Writ should mentioned be;
And hungry crows assembled in a crowd,
Clamored their piteous prayer incessantly,
Knowing who hears the ravens cry, and said;
"Give us, O Lord, this day our daily bread!"

Thus came the jocund Spring in Killingworth,
In fabulous days, some hundred years ago;
And thrifty farmers, as they tilled the earth,
Heard with alarm the cawing of the crow,
That mingled with the universal mirth,
Cassandra-like, prognosticating woe;
They shook their heads, and doomed with dreadful words
To swift destruction the whole race of birds.

A town meeting was convened to consider the matter, and there assembled the farmer, the squire, the deacon, and all the other pompous people who give dignity to such an assemblage. The birds had but one friend among them all, the village schoolmaster. He was in love with the fair Almira of the poem, and so his heart was tuned to compassion and his soul to love and tenderness, and he protested against the determination to put the birds to death.

"The thrush that carols at the dawn of day
From the green steeples of the piny wood;
The oriole in the elm; the noisy jay,
Jargoning like a foreigner at his food,

The blue-bird balanced on some topmost spray.

Flooding with melody the neighborhood;
Linnet and meadow-lark, and all the throng
That dwell in nests, and have the gift of song.

"You slay them all! and wherefore? for the gain
Of a scant handful more or less of wheat,

Or rye, or barley, or some other grain,

Scratched up at random by industrious feet,
Searching for worm or weevil after rain!

Or a few cherries, that are not so sweet
As are the songs these uninvited guests

Sing at their feast with comfortable breasts.

"Do you ne'er think what wondrous beings these?

Do you ne'er think who made them, and who taught
The dialect they speak, where melodies

Alone are the interpreters of thought?

Whose household words are songs in many keys,

Sweeter than instrument of man e'er caught!

Whose habitations in the tree-tops even
Are half-way houses on the road to heaven!

"Think, every morning when the sun peeps through

The dim, leaf-latticed windows of the grove,
How jubilant the happy birds renew

Their old melodious madrigals of love!

And when you think of this, remember too,

'Tis always morning somewhere, and above

The awakening continents, from shore to shore,
Somewhere the birds are singing evermore.

"Think of your woods and orchards without birds!

Of empty nests that cling to boughs and beams
As in an idiot's brain remembered words

Hang empty 'mid the cobwebs of his dreams!

Will bleat of flocks or bellowing of herds

Make up for the lost music, when your teams
Drag home the stingy harvest, and no more

The feathered gleaners follow to your door?

"You call them thieves and pillagers; but know

They are the winged wardens of your farms,
Who from the corn fields drive the insidious foe,

And from your harvest keep a hundred harms;

Even the blackest of them all, the crow,

Renders good service as your man-at-arms,
Crushing the beetle in his coat of mail,

And crying havoc on the slug and sna'l.

"How can I teach your children gentleness,

And mercy to the weak, and reverence

For Life, which, in its weakness or excess,

Is still a gleam of God's omnipotence.

Or Death, which seeming darkness, is no less

The selfsame light, although averted hence,
When by your laws, your actions, and your speech,

You contradict the very things I teach?"

His voice did not prevail, though he warned his hearers of the evils that would befall their crops by the incessant stir of insects in the windrows of the hay, by the ravages of the locust and the grasshopper. The birds were doomed, a bounty was offered for the heads of crows.

And so the dreadful massacre began;
O'er fields and orchards, and o'er woodland crests,
The ceaseless fusilade of terror ran,
Dead fell the birds, with blood stains on their breasts,
Or wounded crept away from sight of man.
While the young died of famine in their nests;
A slaughter to be told in groans not words,
The very St. Bartholomew of Birds!

The summer came, and all the birds were dead;
The days were like hot coals; the very ground
Was burned to ashes; in the orchards fed
Myriads of caterpillars, and around
The cultivated fields and garden beds
Hosts of devouring insects crawled, and found
No foe to check their march, till they had made
The land a desert without leaf or shade.

And, of course, Killingworth had to recall its decision. In the next year birds were imported from the distant country, and with much ceremony were set free in time to sing joyous music over the schoolmaster's wedding,

And a new heaven bent over a new earth
Amid the sunny farms of Killingworth.

The destructive spirit is further afield than the haunts of the deer or the trysting places of the birds. I am assured that the maidenhair fern is fast disappearing from places where it once was very plentiful, to such an extent is it removed from its native places. Happily, however, it may not wholly be destroyed, as it responds easily to careful treatment; but what are we to say respecting the trailing arbutus, whose beauty, fragrance and humility are its great characteristics? It is rapidly being driven from the spots which it dignifies and adorns, so eager is the quest for it, so ruthlessly is it treated by the mercenaries who at every railway stopping place throw it upon us. At one time it was quite plentiful in the vicinity of St. John. Now there is

little of it to be found. It has been torn up by the roots, no opportunity is allowed it to seed itself, and the constant attacks which are made upon it leave no hope that it can survive many years unless in the more inaccessible places. Can we not impress upon our people the idea that it is a sacred duty to preserve our flora and our fauna, and that in so doing we are perpetuating forms of life which are sacred, because they form part of the property in which we all have a common interest and a common ownership?

As part of my observations upon this subject, I might re-waken in your memory knowledge of the fact that a few years ago the Provincial Legislature passed an act by which provision was made for the creation of a Provincial Park in New Brunswick, which was to preserve carefully from all attacks a certain portion of the land at the headwaters of the noble rivers which flow through our Provincial domain; this territory was to be guarded against the axe of the lumberman and the rifle of the hunter. It was to be a reservation of a character somewhat like those recently called into existence by the President of the United States under the laws of that Country. The forests were to be guarded, the waters of the rivers conserved, and the animals and birds which inhabited the region were to be protected. There might be some unity of action among the Natural History Societies of the Province in the direction of giving practical effect to this legislation. The lumbermen are understood to view it with small favour, and this is natural, for they see no good in a tree except in the cutting of it down. But the broad and weighty reasons which moved the members of this Society to seek for and secure that legislation are still effective, and the carrying out of the work projected would increase the total value of provincial property, and create in that property interests far superior to any which could be created by any other means. I grant you that the work would be somewhat difficult, but it is by no means impossible. It would require time and labour, but time and labour could be given to no better cause. Ever before us all is the duty of making the most of this province, in which

are our homes and in which our days are passing; and in the performance of that duty may be pleasures which we cannot realize until we diligently strive for them.

Taking our days as they come and go, there are no greater enjoyments than those which are derived from association with nature in her varied forms and many moods.

To the progress generally of our Society the reports submitted to-day bear ample testimony.

We are comfortably housed, our museums and collections are well cared for; we have a large number of members, many of whom are animated with the true scientific spirit, and are keen observers and persistent explorers. And good feeling abounds. There is much educational work being done among the young, and the youthful thirst for knowledge is so stimulated that we may fairly hope for gratifying results in the future.

FORTY-SIXTH AND FORTY-SEVENTH ANNUAL REPORTS
OF THE
COUNCIL OF THE NATURAL HISTORY SOCIETY
OF
NEW BRUNSWICK.

The report of progress for the past two years nearly (January 1st, 1908, to October 1st, 1909,) is most gratifying. There has been a steadily growing interest in the aims and work of the Society, and it has won a large share of popular regard on account of the attractions that its museum affords and from the benefits arising from its varied courses of lectures. There has been a healthy addition to its membership, and the finances are in excellent condition. The work of the Ladies' Association continues to increase in interest, and the cordial agreement which exists between the Society and its important auxiliary augurs well for our future prosperity.

The summer field meetings and the outings of the Junior Branch and the Junior Associate Branch have led to an increased interest in nature study and field work. We cannot too highly applaud the wisdom that seeks to stimulate and educate people, especially the young, who have a taste for natural history pursuits. Our Society may thus add to its future roll many active scientific workers, and a large number of young persons and people of leisure may be aroused to take an intelligent interest in nature and out-of-door life.

From month to month we are seeing our collections grow into an orderly and attractive series under the skill and proper direction of our Curator, Mr. McIntosh. With his capacity to interest young people in natural history and field work, he should be relieved from clerical and general duties as much as possible

the better to give his attention to our two main interests — the proper equipment of the museum and the furtherance of our educational work.

MEMBERS.

Many members have joined the Society within the past two years. The total enrolled membership of all classes is now as follows:

Honorary	4
Life	21
Corresponding	16
Regular	176
Associate	346
Junior Associate	17
Junior	30
 Total	 612

FINANCIAL.

TREASURER'S STATEMENT FOR NINE MONTHS ENDING SEPT. 30, 1908

Receipts—

Balance from 1907	\$955.00
Ordinary Fees	300.00
Associate Fees	143.00
Junior Associate Fees	7.00
Junior Fees	11.00
Rent of Barn	75.00
Grant from N. B. Government	400.00
Grant from City of St. John	250.00
Bulletins sold	7.50
Donation, James E. White	40.00
Insurance Rebates	22.89

Expenditure—

Improvements to Building	\$16.29
Cleaning Building	27.80
Fuel	132.79
Advertising	85
Maintenance of Museum	372.27
 <i>Carried forward,</i>	 \$550.00 \$2,211.39

<i>Brought forward,</i>	\$550 00	\$2,211.39
Bulletin XXVI.....	169.80	
Interest on Mortgages.....	87.09	
Water Rates.....	28.00	
Stationery and Printing.....	43.95	
Lighting.....	35.12	
Postage and Expressage.....	30.50	
Insurance.....	111.75	
Purchase of Specimens.....	3.50	
Sundries.....	136.35	
New Wall Cases.....	45.27	
Amount added to "Mortgage Fund".....	140.00	
Library Card Index and Cards.....	14.34	
Balance in Bank of N. B.....	815.72	
		\$2,211.39

A. GORDON LEAVITT, *Treasurer.*

Examined and found correct.

October 15th, 1908.

W. F. BURDITT, }
JAMES A. ESTEY, } *Auditors.*

Of the balance of \$815.772, \$33.00 is held in trust for the Ladies' Association.

Our liabilities consist of two mortgages amounting to \$3,500. unsettled bills for repairs to walls, roof, etc., of \$195.35, and the cost of the Bulletin, which will soon be under way.

The "Mortgage Fund" amounts to only \$7.93, \$500.00 having been used to reduce the mortgage from \$4,000 to \$3,500.

The building is insured for \$8,000.00 and the collections for \$3,500.00.

TREASURER'S STATEMENT FOR YEAR ENDING 30TH SEPTEMBER, 1909

Income—

Balance from 1907-8.....	\$815.72
Ordinary Fees.....	\$401.00
Associate Fees.....	363.00
Junior Associate Fees.....	8.00
Junior Fees.....	20.00
<i>Carried forward,</i>	\$792.00

<i>Brought forward,</i>	\$792 00
Province of New Brunswick Grant.....	400.00
From Ladies' Association.....	355.50
Rent of Barn.....	100.00
For Use of Reflectoscope and Room.....	3.00

Donations—

Anonymous, \$2.00; \$2.00.....	\$4.00
Finlay Sanderson.....	5.00
Samuel G. Jordan.....	1.00
	10.00

Donations to pay Exhibition Prizes—

John V. Ellis.....	\$2.00
T. H. Estabrooks.....	2.00
J. A. Estey.....	1.00
W. F. Burditt.....	1.00
Dr. H. G. Addy.....	1.00
Dr. G. U. Hay.....	1.00
J. G. Harvey.....	1.00
W. A. Smith.....	1.00
	10.00

\$2,486.22

Expenditure—

Repairs and Alterations.....	\$190.59
Cases, etc., for Museum.....	18.85
Fuel and Removal of Ashes.....	129.45
Reflectoscope and Express Charges.....	205.50
Sundries.....	17.72
Salaries.....	567.96
Postage.....	37.34
Commissions on Collection of Fees.....	66.40
Insurance Premiums.....	83.00
Cleaning.....	27.05
Stationery.....	59.05
Lights and Lighting.....	80.32
Interest on Mortgages.....	170.00
Cartage and Expressage.....	5.58
Expenses of Visiting Lecturers.....	25.75
Exhibition Prizes.....	10.00
Chairs for Lecture Hall.....	9.00

Carried forward,..... \$1,703 56

<i>Brought forward,</i>	\$1,703 56
Plates for Bulletin	17.81
Screen for Reflectoscope	2.83
Affiliation Fee Women's Council	2.00
Telephone	10.11
Amount held for Ladies' Association Returned	33.00
Balance in Bank of New Brunswick	716.91
	———— \$2,486.22

Examined and found correct.

WILLIAM MCINTOSH, }
W. L. McDARIMID, } *Auditors.*

October 18th, 1909,

Our liabilities consist of two mortgages, amounting to \$3,500, and a few unsettled matters, including the cost of repairs to building and out-buildings not yet completed, estimated at \$100, in all \$3,600.

The building is insured for \$8,000.00 and the collections for \$3,500.00.

The balance to the credit of "Mortgage Account" is \$7.97.

A. GORDON LEAVITT, *Treasurer.*

CURATOR'S REPORT (Wm. McIntosh.)

Herewith is my second report as curator of the museum of the Natural History Society of New Brunswick. The past season (1908), has been a busy one and, in many respects, most satisfactory, as much has been accomplished in preparing for the systematic arrangement of material. The collections have unavoidably been in great disorder and much of the work of the past nine months has been a preliminary arrangement of the material at the museum. These changes make an orderly arrangement possible.

The following is a report of the work accomplished in the various departments of the museum during the past nine months:

ZOOLOGY.—Early in the year we were fortunate in obtaining a specimen of the Snow Goose, this fine bird was not represented in the Society's collection. New stands are being prepared for mounting the foreign birds. These at present are distributed

about the building, when remounted they will be brought together to form a single collection. Some collecting has been done by the curator in all branches of invertebrate life, the material collected being required for the completion of study series of local fauna.

BOTANY.—Generally speaking the museum's collections are a herbarium of about 6,000 mounted sheets, obtained through Dr. Fowler, Dr. Hay, Dr. Matthew and others.

The work of preparing a study collection of local plants has been continued, upwards of 800 specimens being obtained during the past summer, these are being mounted and will be ready for use this winter.

The New Brunswick woods have been re-arranged to form a wall exhibit, and maps have been prepared showing the geographical distribution of each species. A number of specimens which were lacking have been added and additional ones collected to replace poor examples.

The wild flower exhibit aroused much interest, and numbers of visitors came especially to see them. Owing to the great amount of time required to gather the flowers and keep the collection in good condition this feature was omitted after the schools closed for the summer holidays.

MINERALS AND ROCKS.—The Gesner collection of minerals has been carefully gone over and prepared for exhibition. When we consider the vicissitudes through which the collection has passed since it was formed over sixty years ago, a very small number of specimens are missing.

PALAEONTOLOGY.—The exhibition collection of fossils has been dusted and re-arranged temporarily. It is hoped that time will be found during the coming year to have these interesting specimens arranged in the very attractive manner in which such material is arranged in all modern museums.

ARCHAEOLOGY AND ETHNOLOGY.—Three new cases have been installed in the hall. In these are placed the collections of weapons, musical instruments, domestic utensils and objects of a like nature possessed by the Society. At the end of the hall two

cases have been placed. In these will be found a collection of foreign shoes and hats, and a collection of pottery ware, the work of mound builders and cliff dwellers. The removal of this material from the Ethnological room gave opportunity for the installation of New Brunswick relics. We hope soon to have sufficient local material to entirely fill this room. All the objects in the Ethnological department have been re-arranged.

DONATIONS.—During the past nine months there has been seventy accessions to the museum, giving a total of 2,088 specimens. A list of the donations will be found in the appendix.

INVENTORY.—The number of specimens in the museum and books in the library are as follows:

Minera'ogy and Geology	3,903
Paleonthology	3,181
Botany.	7,031
Zoology.	10,131
Archæology.	<u>2,754</u>
Total.	27,000
Library.	<u>11,197</u>
Grand total.	38,197

COLLECTING.—During the summer the following specimens were collected: Botany, 816; Zoology, 419; about 500 Fossils; Minerals, 22; Archaeology, 11; making a total of 1768 specimens. 648 labels have been prepared since the last report was read.

There has been a very rapid development of the educational work of the Society during the past eighteen months. Almost daily, persons come to the museum seeking information, and during the nine months covered by this report, 417 verbal enquiries have been answered. 217 business letters have been written, and over 2000 specimens have been determined.

The number of persons who visited the museum during the past nine months was 2,753.

During the year small collections of common birds, insects, minerals, and Indian relics, have been loaned to the city schools. So anxious were the teachers to obtain the limited material available for this purpose that the specimens were engaged weeks ahead.

A number of teachers brought their classes to the museum for instruction on various subjects and a large number of school and college students have spent many hours in the museum studying for their science examinations.

The thanks of the Society are due the press of the city which has taken much interest in our progress and has published a series of articles on the work of the museum.

In submitting my annual report (1909), it affords me pleasure that the general condition of the museum shows an improvement over that last reported, though it still lacks very much, in the matter of arrangement and labeling, of attaining the ideal we have in mind. The necessity for one person devoting a part of his time to filling the positions of Curator, Corresponding Secretary, also doing all the identifying, labeling and detail work of the collections, naming material and supplying information to school children, teachers, farmers and others, conducting children's outings in summer and lectures in winter, attending to a multitude of minor duties which require much time and attention does not allow of his doing his best in the museum. The present arrangement also necessitates slighting or leaving entirely undone many things outside the regular work that would materially enhance the usefulness of the institution, but for which sufficient time cannot be found.

Notwithstanding these difficulties we are able to report a considerable amount of work done in the museum. The following is a summery of what has been accomplished in the various departments:

ZOOLOGY.—The collection of foreign birds possessed by the Society have been brought together and arranged in one case and a number of specimens were mounted on new stands. The general collection of shells has been re-arranged; this was necessary to incorporate a large number of handsome shells donated recently.

BOTANY.—The principal accession to this department is a collection of seeds, barks, roots and vegetable oils used medicinally, presented by Joseph N. Bardsley.

The wild flower table was one of the most popular features of the museum during the summer.

MINERALS AND ROCKS.—Finding that a mineral collection arranged systematically did not attract visitors, we tried the experiment of arranging them in groups to show their economic uses, exhibited in this way the public examine the specimens and read the labels carefully. We now have on exhibition groups of iron, copper, gold, silver, manganese, zinc, lead and antimony ores, and a small collection of gems and gem minerals which have been loaned the museum.

In the centre of the mineral room a large table has been placed upon which a collection of New Brunswick minerals are shown. A number of minerals and rocks have been collected by A. Gordon Leavitt and the Curator.

PALAEONTOLOGY.—The exhibition collection of fossils has been re-mounted and re-arranged during the year. This was a work of some magnitude, as wooden blocks had to be made and painted, the specimens mounted upon them and pictures prepared to illustrate the collection. The specimens are placed on a sloping wall, in this way every specimen is seen and the collection presents a very attractive appearance.

ARCHAEOLOGY AND ETHNOLOGY.—This department has been entirely re-arranged during the year. This was necessary, as a large number of specimens have been presented, collected and purchased. The large case in the Archaeological room has been used for displaying relics of the Stone Age of New Brunswick. In the case in which the stone implements were formerly exhibited is shown a collection of Indian baskets, bead work and birch-bark work. Much of this material has been obtained during the year. By using some old sashes a temporary case has been made for the centre of the room in which are exhibited Indian games and pottery. The contents of the cases in the hallway on the first floor have been re-arranged and descriptive labels made. Here is shown weapons of war and of the chase, and material formerly exhibited in the Archaeological room. A full size Malecite birch-bark canoe has been loaned the museum and is suspended in the hallway.

DONATIONS.—During the year 1904 specimens have been presented to the museum, a list of these will be found in the appendix.

INVENTORY.—The number of specimens in the museum and books in the library are as follows:

Mineralogy and Geology	4,101
Palaeontology	3,502
Botany	7,281
Zoology	11,347
Archæology	2,954
Total	29,185
Library	12,153
Grand total	41,338

COLLECTING.—The following specimens were collected since our last report: Botany, about 150; Zoology, 516; Rocks, 98; Fossils, 221.

Over 500 verbal enquiries have been answered, 331 business letters written exclusive of acknowledgments of donations to the museum and library, and many hundreds of specimens named for collectors and others. The number of visitors to the museum was 3248.

A number of teachers brought classes to the museum and gave instruction using our collections for illustration. Several classes arranged for special lectures.

COMMITTEE ON GEOLOGY (G. F. Matthew, *Chairman.*)

1908: Samples of the rocks and soils of Prince Edward Island, of the same age as similar ledges on the eastern side of New Brunswick, have been added to the museum; also a number of fossil plants from the cordaites shales of Barrack (Oil-tank) Point, south end of the City of St. John; and specimens of the phosphate beds of South Carolina. Mr. W. J. Wilson, of the Canadian Geological Survey, has been studying the Upper Devonian and Lower Carboniferous strata in Southern New Brunswick, and collecting fossil plants and other organisms with a view of determining more exactly the age of these formations.

1909: Dr. G. F. Matthew's Palaeontological cabinet, which he has offered to the Society as a gift, on condition that the

Society raise sufficient money in three years to pay off the mortgage on its property, has been removed to the rear of the Natural History Society's building. It will be a valuable addition to the collections in this department.

Geological field work in New Brunswick has been carried on chiefly by two members of the staff of the Geological Survey Department. Dr. R. W. Ells has continued his investigations of the bituminous shales of Albert and Westmorland Counties with a view of their realization for the extraction of oil, ammonia and other products. He has found them unusually rich in bitumen, and predicts a prosperous future in the exploitation of these natural resources. Mr. W. J. Wilson has been employed during the summer in collecting the plant remains of St. John and King's Counties with a view of determining more exactly the geological age of the formation that contains these shells. The palaeontologist, Mr. L. M. Lambe, has been studying the fossil fishes of the Albert shales with the same object in view, and concludes that the fishes indicate a Lower Carboniferous age. The usual mining industries have been carried on in the province during the past year in coal, lime, plaster, etc. The antimony mines in York County have been re-opened, and some preparation made to work the iron deposits of Gloucester County. The province is thus in a fair way to make a better showing in mineral production than for some time past.

BOTANY (G. U. Hay, *Chairman.*)

1908: Several new stations for rare flowering plants have been found: *Cypripedium hirsutum*, near Drury's Cove and Ketepec; *Cypripedium pubescens* and *Botrychium lunaria*, Rockwood Park; and *Anthriscus sylvestris* (the English chervil) found near St. John. Three species of fungi new to the province were found at Ingleside: *Polyporus sulphureus*, *Collybia velutipes*, *Inocybe rimosus*, making a total of 318 species found up to this date in New Brunswick. Owing to the dryness of the season, especially in September and October—the months in

which they appear in greatest abundance—the absence of fungi from the fields and woods was very marked.

1909: Mr. M. L. Fernald, of Cambridge, Mass., Professor Wiegand, of Wellesley College, Mass., and Mr. W. H. Blanchard, of Vermont, specialists in systematic botany, were in the province this summer. Their visit has helped to throw fresh light on the distribution of our plants. This, taken in connection with the recent issue of the revised edition of Gray's Manual of Botany, makes it necessary to examine anew the plants of the province with a view to publish, as soon as possible, a revised edition of our flora in accordance with a more modern classification and nomenclature.

ORNITHOLOGY (A. Gordon Leavitt, *Chairman.*)

1909: Quite a number of species are needed in order that the collections may be representative of the bird-life of the province, and, as soon as more cases are provided, many of the gaps can easily be filled. One improvement made in the collections is that all other than native birds have been placed in a case by themselves. This department of our museum continues to prove both attractive and instructive, and the knowledge gained from a study of the collections no doubt does much to prevent bird destruction for fun, or in order that their mangled remains or parts may be used as hat or other ornaments.

INVERTEBRATES (A. Gordon Leavitt, *Chairman.*)

1909: Very little has been done in this department, the collections being already sufficiently full for our present needs, or until suitable cases are provided for a re-arrangement of the collections. About 500 insects have been collected, most of which have been sent to other institutions.

FIELD MEETINGS (W. F. Burditt, *Chairman.*)

A series of six Summer Field Meetings was held by the Society during the season of 1908: July 4th, at Spruce Lake; July 15th, at Drury's Cove; July 25th, at Red Head; August

5th, at Sandy Point, Kennebecasis; August 15th, at Long Island, Kennebecasis; August 26th, at McLaren's Beach, Lancaster.

In arranging the programme, it was deemed advisable to select points of interest near the city not visited by the Society within the last few years. With the assistance of Dr. Matthew, Dr. Hay and other leaders in the different branches, opportunity was offered for studying the different geological formations, the sea-coast and inland fauna and flora in all their variety. All of these meetings were well attended, with the exception of that to Long Island, due to threatening weather. The attendance at the other meetings varied from 45 to 65 or 70. The meetings were much enjoyed by the members attending, and it is felt that the Summer Field Meetings are a very useful and agreeable feature of the Society's operations.

The five meetings held in the summer of 1909 were very largely attended, and were among the most enjoyable and most successful from every point of view of any ever held by the Society.

The first meeting of the series, held at Camp Nature, drew out a large attendance. Coming, as it did, at a time when nature is resplendent in its newly-acquired summer dress, when the days are longest, and the woods and fields are vocal with the singing of birds, every minute of the day, from the arrival at Camp Nature until the return, was thoroughly enjoyed by all present. The ramble through the woods was slightly curtailed by a passing shower, but a natural history outing would hardly be complete without a sprinkle of rain, which, on that occasion, was not sufficient to cause any inconvenience. On return to Messrs. McIntosh and Leavitt's rustic camp, addresses were heard from Mr. McIntosh on trees, principally referring to the different kinds of maples; by Mr. Leavitt on his favourite topic of our feathered friends and their enemies; from Rev. D. Hutchinson on the pleasure and profit of nature study; and from Mr. W. S. Fisher on the advantages of New Brunswick as a place of abode. Messrs. McIntosh and Leavitt, as usual, had in store a surprise for their visitors, which on this occasion took the form of a

neat and attractive little souvenir programme for the day, with a miniature photo of Camp Nature.

The next meeting, at Gondola Point, on July 7th, was no less enjoyable and instructive than have been all the meetings of previous years held at Dr. Matthew's summer residence. The sail up the beautiful Kennebecasis River is in itself a most enjoyable experience, while the hospitality of Dr. Matthew's home, its picturesque environment, the beautiful scenery and botany of the region, all tend to make Gondola Point one of the most attractive and popular resorts for a summer field meeting, and this year's meeting there was no exception to the rule. The weather was very pleasant, though a few threatening clouds prevented the party from wandering too far from shelter. Before leaving the party were pleasantly reminded by Mrs. Matthew that wild strawberries were in season, and devoted some time to a very thorough nature study of that delicious fruit.

Dr. G. U. Hay's charming summer cottage and grounds at Ingleside were the scene of the next rendezvous on July 26th. It was one of the finest of mid-summer days, and members and their friends turned out in unprecedented numbers, so much so that Dr. Hay's ample grounds seemed almost thronged with people, and all who went felt they had been amply rewarded when the day's pleasure and profit were mentally reviewed while waiting for the train or journeying homeward. A special advantage incidental to a meeting at Ingleside is the extensive arboretum of New Brunswick trees, shrubs and plants, which Dr. Hay has there gathered with years of painstaking industry, and which furnishes the living examples with which to illustrate his interesting and instructive botanical talks, enjoyed by a large number to which we now refer. An address by the Venerable Archdeacon on the history (political and social) of the St. John River country, following a talk by Dr. Matthew upon its geological features, added especial interest to the meeting, while a little talk about the moon and planets, with especial reference to Venus and Mercury, by Mr. Burditt, filled in a spare half hour at the ending of a most enjoyable day.

On August 7th the members of the Society and their friends were guests of the President and Mrs. Ellis at "Enilorac," Senator Ellis' picturesque summer cottage, so charmingly situated in full view of the gorge and falls at the mouth of the St. John River. The weather, fortunately, was exceptionally fine, and the large number—over a hundred—who gathered were able to enjoy to the utmost the enchanting scene spread out before them, while watching the interesting changes at the Falls as the tide rose, creating in the course of time a smooth and deep channel for the passage of vessels, where the turbulent rapids had been flowing seaward but a few hours before, and eventually reversing the Falls before the party broke up in the evening. In the meantime most interesting and instructive addresses had been listened to. Dr. Matthew spoke of the geological history of the falls and the river beyond, and explained the probable causes which operated in producing the present outlet and more ancient outlets of the St. John River, while Dr. Hay referred briefly to the occurrence of the saxifrage and other sub-arctic plants in Southern New Brunswick, specimens of which had been found in the vicinity. The Society was especially fortunate on that occasion in having present Professors Fernald, of Harvard, and Wiegand, of Wellesley College. Introduced by Dr. Hay, Prof. Fernald, referring to the presence in this neighbourhood of Arctic flora, spoke very interestingly of the migration of plants as a result of glacial action and other causes. He also referred to his work in connection with the editing of a new edition of Gray's Botany, dwelling upon the valuable service which might be rendered to students and investigators by such societies as ours, if the members would carefully collect specimens for examination by experts.

The last meeting of the season was held at "Tenby" Cottage, Mr. Burditt's residence, Crouchville, and, like its predecessors, was largely attended. On the way out the party, by kind invitation of Messrs. Foley, visited their pottery, and spent a half hour very interestingly in observing the modern process of manufacture in that ancient industry. After arrival at destination, a

ramble upon the seashore afforded abundant material for interesting nature study, while members lingered in groups to discuss the various specimens of marine floras and faunas gathered by the way, or to examine the upturned and contorted strata of the Cambrian shales and slates, comparing the ripple marks and the worn marks just left upon the sands by the receding tide with those of the long ago preserved in the sandstones seen in the adjoining cliffs. Attaining an elevated position on the top of the cliffs at Race-horse Point, the receding coast-line, with its bays and promontories stretching for miles to the southeast, and the Bay of Fundy before them, the party sat down while Dr. Matthew discoursed interestingly upon the geological history of the rocks upon which they rested, and others near by, referring particularly to the rich and full exemplification of Devonian plant life found in the vicinity of St. John, and to recent additions to the flora of that period lately discovered by those indefatigable members of our Society—Messrs. Leavitt and McIntosh. Later the entire party, while gathered upon the lawn at "Tenby" Cottage, were instructively entertained by addresses from Dr. Hay referring to seaweeds and the growth of trees, and from Mr. McIntosh referring to the marine life of our seashores, and to the habits of the winkles, mussels, clams and other species of marine mollusca common to the Bay of Fundy coast. The meeting throughout was considered a fitting climax to a most successful series.

FINANCE (A. Gordon Leavitt, *Chairman.*)

No meetings of this Committee have been held during the year (1909), as nothing of special importance came up, with the exception of Dr. Matthew's kind offer to donate his entire collection to the Society, as soon as the mortgages were paid off (providing that it was accomplished within three years from August 1st last), and, as it was not considered that the time had arrived for a successful endeavour to accomplish that task, no action has as yet been taken. When the value of Dr. Matthew's offer is realized by our members, and they understand that the \$170.00,

which is now paid annually in interest would supply us with all necessary cases, and also purchase valuable material, no doubt an endeavour to raise the amount required for the discharge of the mortgages will meet with success. It will be seen by the statement presented that the balance on hand is only about \$100 less than that of last year, notwithstanding the fact that no grant was received from the City. Last year we received \$250.00. The membership fees, amounting, as they do, to \$792.00, exceed those of last year by \$331.00, and, as the membership is really the same, the increase may be, to quite an extent, accounted for by our having arranged to pay a commission, and have the collections carefully and thoroughly looked after.

BUILDING (W. F. Burditt, *Chairman.*)

The Building Committee has but little to report with reference to the operations of the past year (1909); more or less expenditure is necessarily incidental to the maintenance of a property such as that now owned by the Society, but no improvements have been undertaken, or even considered or recommended by the committee, for the simple reason that the liquidation of the mortgage debt seems to be generally regarded as the first and most important object to be accomplished. Therefore, although there are no doubt many improvements in the interior arrangement of the building which might be made with great advantage to the museum, consideration of the subject has been deferred until funds for that purpose would appear to be available. In the meantime, much repairs to the exterior of the building, as appeared to be necessary, have been, or are being, attended to. Although a considerable amount of work in the way of pointing, plastering and repairing the brick-work of the rear wall was done in 190, some further work of the same kind has been found necessary, and has just been completed. A small expenditure has also been made upon the interior of that portion of the premises leased to Dr. Matthew, to render them suitable for his purpose, and at the suggestion of the Associate members a higher platform has been provided for the lecture room.

LECTURES (G. U. Hay, *Chairman.*)

Seven regular meetings were held in the first part of 1908. The following are the dates of the meetings and subjects:

1908.

January 7—(a) The Indian as a Potter.—Mr. William McIntosh.
(b) Physiographic Evolution of the Upper St. John and Restigouche Basins.—Professor W. F. Ganong, Ph. D.

January 21—Annual Meeting. President's Address. Report of Council Election of Officers.

February 4—Enemies Protected and Friends Abused.—Mr. A. Gordon Leavitt.

March 3—Some Glimpses of England.—Dr. L. W. Bailey.

April 7—Those Other Worlds — Are They Inhabited? — Mr. W. F. Burditt.

May 5—(a) When Birds Arrive; with Character Sketches.—Mr. J. W. Banks.
(b) Natural History Notes about Prince Albert, Sask.—H. F. Perkins, Ph. B.

June 2—Report of Delegates to Royal Society. Plans for Field Meetings Discussed.

A course of Popular Lectures was given on Tuesday evenings not occupied by the regular meetings of the Society. The dates of the meetings and subjects were as follows:

1908.

January 14—With Drummond and His People.—Mr. E. A. Smith.

January 28—Theories of Medical Science.—Mr. H. A. Powell, K. C.

February 11—Sleeping Life.—Judge Willrich.

February 18—The Function of the Circulation in Tissue Metabolism.—Dr. T. D. Walker.

February 25—The Life and Times of Haliburton.—Mr. Geo. A. Henderson.

March 10—Among English Hedgerows.—Dr. G. U. Hay.

March 17—The Nervous System.—Dr. Stewart Skinner.

March 24—The Real Northwest.—W. A. Hickson.

An interesting course of historical lectures, chiefly on Acadia, was given in the fall of 1907, followed by a course of free lectures, by the Ladies' Association during the winter of 1908. The following are the dates and subjects of the latter:

1909.

January 9—Scenes from the Life of Huxley.—Mrs. G. F. Matthew.

January 16—Some Impressions of the Spanish-American War.—Miss Charlotte Wilson.

January 23—A Trip to the West Indies.—Miss Alice Fairweather r.

January 30—Neckar and His Daughter.—Mrs. Silas Alward.

February 6—Impressions of Paris.—Mrs. F. Foster.

February 13—Some French Cathedrals.—Mrs. John Sealy.

February 20—Trees.—Miss Homer.

February 27—Singing Bird-Time in England.—Mrs. G. U. Hay.

A course of illustrated lectures to children was given during the season.

Eleven regular meetings, including a conversazione, were held during the season beginning October 6th, 1908, and ending June 1st, 1909. The following are the dates of the meetings and subjects:

1908.

October 6—Results of Summer Field Meetings.—By the Leaders of Sections

October 20—Annual Meeting. President's Address. Council's Report. Election of Officers.

October 27—Conversazione.

November 3—(a) Sport and its Effect.—Mr. A. Gordon Leavitt.

(b) On the Physical Geography of the South-west Miramichi; On the Physical Geography of the Municac River.—Prof. W. F. Ganong, Ph. D.

December 1—The Swim Bladder in Fishes.—Professor Philip Cox, Ph. D.
1909.

January 5—(a) Forestry Work in Southern Pine Districts.—Professor R. B. Miller, D. Sc.

(b) On Forestry Conservation.—Prof. W. F. Ganong, Ph. D.

1909.

February 2—(a) Stone Craft of the New Brunswick Indians; (b) Preliminary List of the Beetles of New Brunswick.—Mr. William McIntosh.

March 2—Early Spring Flowers of England and Eastern Canada.—G. U. Hay, D. Sc.

April 6—(a) Physical Evolution of Acadia; Continental Phase. (b) Phosphate Beds in South Carolina and New Brunswick.—G. F. Matthew, D. Sc.

May 4—(a) Mines and Mining; (b) History of Currie's Mountain, (read by title)—L. A. Bailey, Ph. D.

June 1—Report of Delegate to Royal Society. Outline of Summer's Work Discussed.

The popular lectures, with the dates and subjects for the winter of 1909, were as follows:

1909.

January 12—Some Impressions of a Visit to Europe.—L. W. Bailey, Ph. D.

January 19—French and English Colonization in North America.—W. Frank Hatheway, M. P. P.

January 26—The Mechanical and Vital Elements in the Intellectual Life.—Professor W. W. Andrews, LL. D.

February 9—Darwin Centenary. Introductory Paper by Mr. James A. Estey. Discussion.

February 16—The Credulity of Science.—Geo. G. Melvin, M. D.

February 23—Health and How to Preserve it.—Stewart Skinner, M. D.

March 9—The Relation of Mathematics to the Other Sciences.—Chancellor C. C. Jones, LL. D.

March 16—Vacation Rambles in England and Scotland.—Rev. D. Hutchinson, M. A.

March 23—The Problem of Transportation.—Mr. W. S. Fisher.

April 6—The Approaching Return of Halley's Comet.—Mr. W. F. Burditt.

An interesting course of lectures on Folk-Lore (with music) was given in the latter part of 1908, followed by two musical entertainments, the proceeds of which were devoted to the purchase of a reflectoscope. A second course of free lectures was delivered under the auspices of the Ladies' Association during the winter of 1909. The following are the dates and subjects of the latter course:

1909.

January 14—The Ideals of William Morris in Household Decoration.—Mrs. J. W. B. Stewart.

January 21—Renewed Impressions of English Rural Life.—Mrs. Arthur Kirkpatrick.

January 28—A Visit to the West Indies.—Miss Alice Fairweather.

February 4—Schools of Dickens.—Mrs. R. C. Skinner.

February 11—London Through the Centuries.—Mrs. John Sealy.

February 18—A Month in Charleston.—Mrs. G. F. Matthew.

February 25—Home Economics.—Miss K. R. Bartlett.

March 4—Another Word About English Songbirds.—Mrs. G. U. Hay.

March 11—Quebec and the Tercentenary.—Mrs. T. H. Bullock.

A course of seventeen illustrated talks, embracing easy subjects in science and travel, was given during the season to children.

MICROSCOPY SECTION (G. G. Melvin, M. D., *Chairman.*)

Dr. Melvin reported, stating that while no active work had been done during the past two seasons, the Section would hold itself in readiness to do in the future whatever the Council or the Society may indicate that would prove of use or advantage to its members.

LIBRARY (J. G. MacKinnon, *Chairman.*)

During the past nine months (January 1st to October 1st, 1908,) the card cataloguing has been carried on by the Curator, and 560 new cards have been prepared, making a total of 1,000 cards. The pamphlets and paper covered books have been arranged in series and volumes. Many additions have been made to the library, 711 new books having been received through exchange and donations, making in all 10,900 books and pamphlets. Among the books especially valued is Deny's Description and Natural History of Acadia, presented by Dr. W. F. Ganong, and a collection of books presented by Rev. Dr. T. H. Fotheringham. It is felt that better accommodation is needed for the paper covered books, and we hope before long to have them properly shelved. There is a great fund of information in these books, but until they are properly catalogued and shelved they are almost useless for reference. Our library could be made much more useful to our younger members if some books were added which would deal with scientific subjects in more familiar language.

Mr. W. L. McDiarmid, Chairman of the Library Committee for the year 1909, reported that shelves have been made for the pamphlets and paper-covered books. The reports of the various scientific societies with which we exchange have been arranged alphabetically, and are now easily accessible. Some card cataloguing has been done, but the work is slow, and it is a matter of regret that it is not progressing as rapidly as one would like to see. We have received several donations of old and valuable books during the year.

PUBLICATIONS (G. F. Matthew, *Chairman.*)

Owing to the decision of the Council to delay publication of the Bulletin until after the annual meeting of this year (1909) this publication will be taken in hand as soon as possible thereafter.

REPORT OF THE LADIES' ASSOCIATION.

1908: It is with great pleasure that I herewith present the annual report of the Ladies' Association of the Natural History Society of New Brunswick, and am able to speak so favourably of its work during the past year.

It is very gratifying to know that our membership continues to increase and that the Association has been able to give substantial help to the finances of the Society, as well as to arrange for courses of afternoon lectures that have been very popular and instructive. These lectures we are proposing to continue during the present season (1908-09), and have already secured a number of ladies as lecturers, whose addresses will maintain the high standard reached the past season. The subject of these lectures will be found in the Lecture Programme. The Associate membership now reaches about three hundred, which is not very far from doubling the number reported last year, and the number of life members continues to increase.

As in the previous year, the ladies have found means to pay the salary of the assistant librarian, Miss Hoyt, who also is corresponding secretary of the Ladies' Association, and, with an improved knowledge of the wants of the Society, her services have become increasingly useful. One of the most promising undertakings of our Association during the past year is the establishment of a Girls' Branch, in which there are at present twelve members. We hope that these young people will take up scientific work with the same enthusiasm that the boys of the Junior Branch have displayed.

The annual meeting of the Ladies' Association was held in October, and the following officers were elected: President, Mrs. G. F. Matthew; Vice-presidents, Mrs. G. U. Hay, Mrs. G. F. Smith and Mrs. John H. Thomson; Recording Secretary, Mrs. C. A. Macdonald; Corresponding Secretary, Miss F. A. Hoyt; Treasurer, Miss Grace W. Leavitt.

1909: The Ladies' Association has much pleasure in stating that the past year has been one of harmony and progress in all its branches. It is gratifying to note that we have had a steady

increase in members. Still, we are not satisfied, as satisfaction means stagnation. The annual re-union of members was held on October 27th.

The course of lectures on Folk-Lore, each lecture illustrated, with music by prominent musicians, was much enjoyed, judging by the interest manifested and the members in attendance. Two additional lectures, giving the story of Wagner's great operas—Lohengrin and Tannhauser—were also given. Financially, at least, this course far eclipsed those of former years—the grand total amounting to \$393.80. There have also been the usual number of free lectures. This course is becoming each year a more important factor in the educational life of our young people.

The Junior Branch reports a successful year's work. It has enrolled several new members, and had a number of pleasant and profitable outings.

HELEN A. MACDONALD.

TREASURER'S REPORT

Receipts—

1908	By balance	\$35 00
	Course Lectur receipts	256.25
	Lecture given by Mrs. G. F. Matthew	29.00
	Lecture given by Miss Homer	28.60
	Sale of "Erica" and "Song of the Bell"	19 35
1909	Donation, Mrs. Gilbert Murdoch	10.00
	Donation, Dr. T. D. Walker	5.00
	Received from A. Gordon Leavitt money held in trust from Ladies' Association	33.00
Sept.	Donation, Miss Jardine, Boston	1.00

Expenditure—

1908	Cleaning room and washing dishes for reception	\$2.50
	Woman, washing dishes for Lecture Course	3.00
	O. H. Warwick, bill	90
	Printing Course Tickets	3.50
	Printing Course Tickets, Lecture	1.00
	<i>Carried forward,</i>	\$10 90
		\$417 20

<i>Brought forward,</i>	\$10 90	\$417 20
Hire of Piano.....	12.00	
Toronto News.....	50	
Cost of Reflectoscope.....	202.50	
Express and Duty.....	3.00	
Miss Hoyt's Salary.....	150.00	
Coaching.....	60	
	<hr/>	
	\$379.50	
Balance on hand.....	37.70	
	<hr/>	
		\$417.20

GRACE W. LEAVITT, Treasurer.

GENERAL.

The foregoing reports will show these have been the most successful years of the Society. The Treasurer's report shows that more fees have been collected this year (1909) than ever before. This is due to the efficient work of our collector, Miss Hoyt. The Ladies' Association has been active, and has made a more liberal contribution than usual to our treasury, in addition to raising enough money to pay for a reflectoscope.

The lectures have been of an excellent character, and were thoroughly enjoyed by those who attended. Fifty-seven lectures were given during the year. The visitors have been numerous, and it is very gratifying to find that those interested in nature are coming to our museum to procure help in the various lines of study which they are pursuing. The teachers and pupils of the public schools are using our collections to good advantage.

The conversaziones or re-unions of our members have been very successful, drawing many to spend a social evening together and examine the collections.

The Society wishes to thank all those who have helped to make this year so prosperous. Particularly should be mentioned the press of the city, which has published our notices and the accounts of our meetings; those who have given us such interesting lectures; Dr. Matthew for his generous offer; Miss Hoyt for her faithful services as collector, as well as for her efficient work in the museum; and Mr. Leavitt for his painstaking work of treasurer.

DONATIONS.

(1908.)

ARCHÆOLOGY AND ETHNOLOGY.

BALMAIN, DAVID—Collection of one hundred and fourteen Stone Age relics of New Brunswick.

BALKNAM, H. M.—Circular cupped stone found near Moncton.

BRIDGES, FRED T.—Stone axe, gouge and implement found near French Lake, N. B.

CARMAN, MISS AMY V.—Old beadwork bracelet.

DISBROW, MISS—Two watercolor paintings of New Brunswick Indians, by the late John Stanton.

FAIRWEATHER, PERCY R. L.—Native axe, club, and shield, South Africa.

GILBERT, HARRIS—Stone Age relires from France.

HOYT, MISS F. A.—Indian basket work.

LINGLEY, LOUISE—Indian basket work.

LONDON, DUNCAN—Seventy specimens of Stone Age relires, collected in the Grand Lake region, N. B.

MATTHEW, GEO. F.—Model of native canoe from Oceania.

MCGAFFIGAN, J. J.—Flint used for striking fire.

MCKINNON, JOHN G.—Indian relires from Grand Lake.

MCKINNON, ELIZABETH—Indian stone implements from Grand Lake region.

MCINTOSH, WILLIAM—Axes, arrow and spear heads and other stone implements from French, Maquapit, and Grand Lakes.

PURDON, CAPT. W., S.S. Yola—Zulu, Swazi and Basuto assegais, South Africa. Carved gourds from Congo.

RITCHIE, MISS MARY E.—Indian quillwork box.

TRITES, MISS—Birch bark box. Water jug from West Indies.

ZOOLOGY.

BURNS, MISS ANNIE—Wood showing work of marine invertebrates.

HAY, DR. G. U.—Colored chart of Canadian birds.

MICHAELSON, DAVID—Lump fish.

MERRITT, MISS—Hornet's nest.

MORRISEY, HENRY—Skin of kangaroo mouse.

MCADAM, HOWARD—Mounted specimen of white winged crossbill.

PURDON, CAPT. W., S.S. Yola—Collection of sea shells, antelope horns, South Africa; living tortoise, Mauritius.

PATTON, MISS—Group of tropical birds, mounted.

ROBSON, MRS. W. L.—Coral.

SCOTT, GEO.—Hydroid from Bay of Fundy.

WISDOM, MRS. F. W.—Shell of chambered nautilus.

BOTANY.

BARDSEY, JOSEPH N.—Fifty-four kinds of vegetable seeds, barks, roots, etc., used in medicine.

EMERSON, MRS. SYDNEY—Album of wild flowers from Yellowstone Park, U. S. A.

HARDING, MRS. JAMES S.—Ferns from West Indies.

GILLAN, A. H.—Silver leaves from South Africa.

MORRISEY, HENRY—Chain fern from Nova Scotia.

MCKENZIE, A. Z.—Curious growth of pine tree.

PURDON, CAPT. W.—Seeds of travellers tree, Mauritius.

STARR, F. P.—Botanical specimens gathered by the late R. P. Starr.

PALÆONTOLOGY.

CROSSLEY, J. H.—Fossil from River Hibbard, N. S.

LEAVITT, A. GORDON—Fossils from Devonian and Silurian rocks, N. B.

MATTHEW, GEO. F.—Fossils from the phosphate beds, South Carolina.

MCINTOSH, WM.—Fossils from rocks at Murphy's Point, St. John.

THOMPSON, STANLEY—Fossils from Silurian rocks, Oak Point, N. B.

MINERALS

ALBEE, MRS. A. B.—Lava from Azores

DISRAELI ASBESTOS CO.—Examples of asbestos.

FLETCHER, HUGH—Volcanic rock from N. S.

FONSECA, JOSEPH—Quartz crystal collected at the 87th parallel north latitude by a member of the Peary party, 1909.

GEOLoGICAL SURVEY OF CANADA—Smaltite and nicolite from La Rose mine, Cobalt, Ont.

HARDING, MRS. JAMES S.—Large flint nodule.

LEAVITT, A. GORDON—Rocks from Hampton, N. B.

MATTHEW, DR. GEO. F.—Rock specimens from Kingston, N. B.

McLAREN, —— Banded sandstone rock, St. John City.

MCINTOSH, WM.—Polished verde antique, St. John, N. B.

PORTER, HORACE A.—Antimony ore from Lake George, N. B.

ROKES, —— Iron pyrites in limestone, Brookville, N. B.

YOUNGCLAUS, MRS. THOS.—Minerals from Ireland and red granite from St. George, N. B.

LIBRARY.

BERRYMAN, MRS. JOHN—Cabinet and bookcase.

HAY, DR. GEO. U.—Educational Review, vols. XX, XXI.

HOYT, JAS. A.—Ancient book on Heaven and Hell.

GANONG, PROF. W. F.—Science for 1909.

HARDING, JAS. S.—A number of very old books.

MCINTOSH, MRS. D.—Work of Thomas à Kempis, 1722.

MOWATT, WM.—Text book of entomology.

GENERAL.

DISBROW, MISS—Desk.

FAIRWEATHER, ARTHUR C.—One cent, U. S., 1909.

GRIFFITHS, MISS—Two glass globes.

HOYT, R. C.—Knives used in harvesting sugar cane, Kingston, Jamaica.

MOWATT, WM.—Trays for microscope slides.

MURRAY, MRS. FRED W.—Photograph of the train which conveyed the Prince of Wales to Rothesay in 1860.

SCOTT, GEO.—Letter from San Francisco at the time of the great earthquake.

TILLEY, LADY ALICE—Papers relating to the late Sir S. L. Tilley.

THORNTON, MRS. CLARA—Old photograph of St. John, N. B.

(1909.)

ARCHAEOLOGY AND ETHNOLOGY.

ALDEN, MRS. GEO. E., Boston, Mass.—Melecite Indian Basket.

CRAWFORD, MRS. W. K.—Mortar and pestle once the property of the Rev. Mr. Scovil, the first rector of Kingston, N. B.

FOTHERINGHAM, REV. T. F.—Basket made by Indians of Ontario.

GILLEN, ALBERT H.—Miner's safety lamp.

HAWKER, WM.—Stone from church built in 450 A. D.

KIMBALL, CHAS. F., Boston, Mass.—Melecite Indian basket.

KINNEAR, F. A.—Weapon made with shark's teeth, Kingsmill Islands.

LEAVITT, A. GORDON—Micmac Indian baskets from Prince Edward Island, and Melecite Indian basket, New Brunswick.

MATTHEW, DR. W. D.—Sioux Indian stone club from the Western States.

MCKINNON, J. G.—Relics from prehistoric Indian camp sites, Fryes Island, N. B.

MORRISEY, GEO.—Pair minature sabots.

MUNDEE, ARTHUR K.—Fac simile of the marriage certificate of Lord Nelson.

MURDOCH, MRS. GILBERT—Indian basket work from British Columbia.

PURVES, MISS LOUISE—Two pairs of shoes as worn by French peasants.

RILEY, THOS.—Historical papers.

SMITH, MRS. GEO. F.—Four pieces of Indian beadwork from Quebec.

WILMOT, MISS—Birch bark box decorated with quills, said to be over 100 years old.

ZOOLOGY.

BANKS, JAMES W.—Skins of song sparrows and lesser sandpiper.

BELYEA, JAS. A.—Skin of Holboells grebe.

CALKIN, MRS.—Two hornets nests.

FINLEY, MRS. JOS.—Shells from Palm Beach, Florida.

FOTHERINGHAM, REV. THOS. F.—Sea shells and galls from California, mounted specimen of horned toad.

GRUNDMARK, CAPT. J.—Two eel-like fishes from the Gulf of Mexico.

HARDING, MASTER MERLYN—Mounted specimen of pilated woodpecker.

HAMILTON, MRS. GEO. A.—Collection of sea shells.

JARDINE, ROBT., Springhill, N. B.—Cocoon of cecropia moth.

KINNEAR, F. A.—Forty-eight bird's eggs, 9 mounted animals and birds, 12 bird skins, 3 bird nests, 1 horned toad, 131 shells, 1 mounted Tarantula.

LANE, JOHN—Two photos of "Blanca and Lobo" by Ernest Seton Thompson.

LEAVITT, A. GORDON—Mounting grebe, mounted specimen of rat and star-nosed mole, collection of marine invertebrates of Prince Edward Island.

MARTIN, MRS. W. ARCHIBALD—Wood showing ravages of engraver and other wood boring beetles.

MCINTOSH, WM—Indian pheasant.

MERSEREAU, MRS. I. B.—Large hornet's nest.

MICHAELSON, DAVID—Two basket star fish.

MORRISEY, ALFRED—Six mounted birds and 15 bird skins.

MUNDEE, ARTHUR K.—Shells from Bermuda.

ROBERTSON, JAS. F.—Mounted specimen of hawksbill turtle.

WARLOCK, MRS.—Barnacles, New Brunswick.

WETMORE, JAS. N.—Section of wood gnawed by beavers.

WILSON, MRS.—Collection of sea shells.

BOTANY.

CHRISTIE, JAS.—Section of wood showing abnormal growth.

LONGMAID, MISS—Plants from the Southern States and Palestine.

McLACHLAN, MRS.—Forty specimens of New Brunswick plants.

MUNDEE, ARTHUR K.—Pods of coco and woman's tongue seeds

WILLIS, MISS AZALEA, Charleston, S. C.—Miniature bale of cotton and rice from Charleston, S. C.

WILLETT, GORDON—Chinese Nuts.

PALAEONTOLOGY.

ESTEY, JAS. A.—Two fossils.

HILL, J. W.—Fossils from near Hampton, N. B.

LEAVITT, A. G.—One hundred and thirty-nine Silurian plant fossils from Oil or Barrack Point, St. John..

LEAVITT, A. G. and WM. MCINTOSH—About four hundred fossils from Ratcliff's Millstream, (Cambrian.)

MCINTOSH, WM.—Silurian fossils from Nerepis, N. B., and eighty Silurian fossils from Ottawa, Ont.

RAINNIE, MISS ALICE—Specimens of Devonian fossils from Campbellton, N.B.

MINERALS.

BURNS, T. M.—Large flint nodule..

CAMERON, MISS M.—Polished agate from Sudbury, Ont.

CAMPBELL, P.—Carboniferous fossil from Pennsylvania.

DISBROW, MISS—Rolled pebble showing quartz bands.

FINLEY, MRS. JOSEPH.—Building stone and sand from Bermuda.
FOTHERINGHAM, REV. T. F.—Thirty mineral specimens.
FRINK, ———, Eight mineral specimens.
HOYT, R. C.—Mineral specimens.
HOVEY, J.—Specimens of copper ore from the Cobbler Sexton mine, Northampton, N. B.
KINNEAR, F. A.—One hundred and thirty-six mineral specimens.
LEAVITT, A. G.—Collection of the rocks, sand and earths of Prince Edward Island, collected by the donor.
MCLEAN, S.—Chalcopyrite, La Tete Mine, N. B.
MUNDEE, A. K.—Mineral specimens from Bermuda.
MURDOCH, WM.—Specimens of tripolite.

COINS.

PAUL, Jas. A.—Eight silver and copper coins.
WILLIAMS, SAMUEL—Copper coin.
EASTON, H. V.—British farthing, 1903.
FARREN, G. C. M.—Silver fifty cent piece, British Honduras.
KINNEAR, F. A.—Collection of one hundred and seventy-five silver and copper coins.
PAUL, JAS. A.—Collection of eight silver and copper coins.

LIBRARY.

ANONYMOUS.—Forty-three numbers of the Canadian Illustrated News.
FOTHERINGHAM, REV. T. F.—Canadian Entomologist 1877 to 1884, Reports of the Geological Survey of Canada for 1863, 1882 to 1888 inclusive. Report of Canadian Meteorological Service for 1874, 1876, 1878, 31 numbers Fortnightly Review, 39 numbers Contemporary Review, 31 numbers Nineteenth Century Reports, Entomological Society of Ontario 1876 to 1883 inclusive.
GANONG, DR. W. F.—Deny's Description and Natural History of Acadia. Translated and edited by W. F. Ganong, Ph. D., Science Volume 26.
KINNEAR, F. A.—One hundred and ten old newspapers containing articles of historical value, a number of documents, books, etc.

OFFICERS AND COMMITTEES FOR 1908.

OFFICERS.

President—Hon. J. V. Ellis, LL. D.

Vice-Presidents—G. F. Matthew, D. Sc., G. U. Hay, D. Sc.

Treasurer—A. Gordon Leavitt.

Corresponding Secretary and Curator—William McIntosh.

Recording Secretary—J. G. MacKinnon.

Librarian—W. L. McDiarmid.

Additional Members of Council—H. G. Addy, M. D., T. H. Estabrooks, Jas. A. Estey, W. F. Burditt, J. Roy Campbell.

LADIES' ASSOCIATION.

President—Mrs. G. F. Matthew.

Vice-Presidents—Mrs. G. U. Hay, Mrs. G. F. Smith, Mrs. J. H. Thomson.

Treasurer—Miss Grace W. Leavitt.

Recording Secretary—Mrs. Chas. A. Macdonald.

Corresponding Secretary—Miss F. A. Hoyt.

STANDING COMMITTEES.

Archaeology—Joshua Clawson, S. W. Kain, A. C. Smith, M. D., Duncan London Lakeville, N. B.; Mrs. C. F. Woodman, Mrs. John A. McAvity.

Botany—Dr. Geo. U. Hay, Dr. W. F. Ganong, J. Vroom, W. J. S. Myles, Mrs. James F. Robertson, Miss Annie D. Robb, Miss K. A. M. Cotter.

Invertebrates—A. Gordon Leavitt, W. S. Morrison, M. D., Mrs. J. A. Coster, Miss Kate Olive, Miss Gladys Frink, Miss Isabelle J. Caie.

Ornithology—A. Gordon Leavitt, James W. Banks, W. L. McDiarmid, Thos. Stothart, Mrs. G. U. Hay, Mrs. J. M. Lawrence, Miss Maude Gibson, Miss H. M. Ward.

Astronomy and Meteorology—W. F. Burditt, D. Leavitt Hutchinson, Wm. Murdock, C. E., Wm. Brodie, J. K. Scammell, C. E., Mrs. Geo. F. Smith, Mrs. T. H. Estabrooks, Mrs. L. A. Curry.

Geology—Dr. Geo. F. Matthew, Dr. L. W. Bailey, James A. Estey, Rev. David Hutchinson, Mrs. John Sealy, Mrs. T. H. Bullock, Miss Alice Rainnie, Miss Annie M. Hea.

Microscopes—G. G. Melvin, M. D., W. L. Ellis, M. D., W. H. Mowatt, T. D. Walker, M. D., Miss K. R. Bartlett, Miss M. A. Nannary.

Photography—G. Ernest Fairweather, C. P. Clarke, Geo. A. Henderson, T. Percy Bourne, F. H. J. Ruel, Henry Town, Mrs. W. Z. Earle, Mrs. J. Lupton McAvity, Mrs. F. B. Cowgill, Mrs. M. V. Paddock.

Library—W. L. McDiarmid, J. G. MacKinnon, W. M. Jarvis, Hon. J. G. Forbes, H. A. Powell, K. C., Mrs. W. F. Hatheway, Mrs. G. U. Hay, Mrs. Geo. F. Matthew, Miss Grace W. Leavitt.

Lectures—Dr. G. U. Hay, H. G. Addy, M. D., T. H. Estabrooks, W. S. Fisher, Richard O'Brien.

Building—W. F. Burditt, G. Ernest Fairweather, T. H. Estabrooks, A. Gordon Leavitt, James A. Estey, H. G. Addy, M. D., J. Roy Campbell.

Press—Dr. Geo. F. Matthew, A. G. Leavitt, W. F. Nobles, W. L. McDiarmid.

Publications—Dr. Geo. F. Matthew, Dr. Geo. U. Hay, W. E. Earle, T. H. Bullock, Arthur P. Hazen, Charles A. Macdonald.

Finance—A. Gordon Leavitt, J. Roy Campbell, W. F. Hatheway, T. H. Estabrooks, James A. Estey, R. B. Emerson.

President and Curator are members ex-officio of all committees.

OFFICERS AND COMMITTEES FOR 1909.

OFFICERS.

President—Hon. J. V. Ellis, LL. D.

Vice-Presidents—G. F. Matthew, D. Sc., G. U. Hay, D. Sc.

Treasurer—A. Gordon Leavitt.

Corresponding Secretary and Curator—William McIntosh.

Recording Secretary—J. G. MacKinnon.

Librarian—W. L. McDiarmid.

Additional Members of Council—H. G. Addy, M. D., T. H. Estabrooks, Jas. A. Estey, W. F. Burditt, J. Roy Campbell.

LADIES' ASSOCIATION.

President—Mrs. G. F. Matthew.

Vice-Presidents—Mrs. G. U. Hay, Mrs. G. F. Smith, Mrs. J. H. Thomson.

Treasurer—Miss Grace W. Leavitt.

Recording Secretary—Mrs. Chas. A. Macdonald.

Corresponding Secretary—Miss F. A. Hoyt.

STANDING COMMITTEES.

Archaeology—Wm. McIntosh, S. W. Kain, Rev. J. J. McCaskill, A. Gordon Leavitt, Dr. G. F. Matthew, John MacKinnon, Duncan London.

Botany—Dr. G. U. Hay, Dr. W. F. Ganong, J. Vroom, M. A., W. L. McDiarmid, J. G. MacKinnon.

Invertebrates—Wm. McIntosh, A. G. Leavitt, W. H. Mowatt, Miss S. B. Ganong, Miss G. Frink.

Ornithology—A. G. Leavitt, Jas. W. Banks, Thos. Stothart, Mrs. G. U. Hay, Mrs. J. W. Lawrence.

Astronomy and Meteorology—W. F. Burditt, D. L. Hutchinson, Dr. G. U. Hay, Joshua Clawson, Mrs. Geo. Lee, Mrs. G. U. Hay.

Geology—Dr. G. F. Matthew, Dr. L. W. Bailey, Jas. A. Estey, Rev. David Hutchinson, A. G. Leavitt.

Microscopes—W. H. Mowatt, Dr. G. G. Melvin, Dr. T. D. Walker, Dr. W. L. Ellis, Dr. Wm. Warwick.

Photography—C. P. Clarke, G. Ernest Fairweather, Geo. A. Henderson, T. Percy Bourne, Henry Town, F. H. J. Ruel.

Library—W. L. McDiarmid, J. G. MacKinnon, W. H. Mowatt.

Lectures—Dr. G. U. Hay, Dr. H. G. Addy, Wm. Brodie, W. S. Fisher, Dr. McInerney.

Building—T. H. Estabrooks, A. G. Leavitt, Dr. Geo. F. Matthew, W. F. Burditt, Dr. H. G. Addy.

Press—Dr. G. U. Hay, A. G. Leavitt, Dr. G. F. Matthew.

Publications—Dr. G. F. Matthew, Dr. G. U. Hay, A. G. Leavitt, Chas. A. Macdonald.

Finance—A. Gordon Leavitt, J. Roy Campbell, W. F. Hatheway, T. H. Estabrooks, Jas. A. Estey, R. B. Emerson.

LIST OF MEMBERS,

PATRON.

The Lieutenant-Governor, HON. L. J. TWEEDIE, LL. D.

HONORARY MEMBERS.

BAILEY, PROF. LORING W., PH. D.....	University of New Brunswick.
GANONG, PROF. W. F., PH. D.....	Smith College, Northampton, Mass.
LAFLAMME, MGR. J. C. K.....	Laval University, Quebec.
MARR, PROF. JOHN E.....	St. John's College, Cambridge, G. B.

LIFE MEMBERS.

CAMPBELL, J. ROY, St. John, N. B	KAIN, S. W., M. A., St. John, N. B.
CHAMBERLAIN, MONTAGUE, Boston, Mass	LEAVIIT, A. GORDON, St. John, N. B.
EARLE, W. E., St. John, N. B	LEAVITT, MISS GRACE W., St. John, N. B.
EARLE, MRS. W. E., St. John, N. B	LONGMAID, MISS S., St. John, N. B.
ELLIS, HON. JOHN V., LL. D., St. John, N. B	MATTHEW, G.F., D.Sc., LL.D., St. John, N. B.
ESTABROOKS, T. H., St. John, N. B	MATTHEW, MRS. G. F., St. John, N. B.
FISHER, G. S., St. John, N. B	MATTHEW, ROBT., M. A., Cienfuegos, Cuba.
GANONG, PROF. W. F., PH. D., Northampton, Mass.	MURDOCH, MRS. GILBERT, St. John, N. B.
GANONG, G. W., M. P., St. Stephen, N. B	MCINTOSH, WM., St. John, N. B.
HAY, G. U., D. SC., St. John, N. B	WOODMAN, MRS. C. F., St. John, N. B.
HEGAN, JAS. B., Charlottetown, P. E. I	

CORRESPONDING MEMBERS.

BRITTAINE, JOHN, D. Sc., Macdonald Col., Que	STEAD, GEOFFREY, C. E., Chatham, N. B.
BUTLER, W. S., Butler, Queens Co., N. B	VROOM, JAMES, St. Stephen.
COX, PHILIP, PH. D., Fredericton, N. B.	WALKER, BYRON E., Toronto.
DUFF, PROF. A. W., PH.D., Worcester, Mass	WILSON, WILLIAM J., Ottawa.
FOWLER, REV. PROF. J., LL.D., Kingston, Ont	HOYT, W. B., Andover.
LONDON, DUNCAN, Lakeville Corner, N. B.	HAMILTON, D. W., PH. D., Fredericton.
MACKAY, DR. A. H., LL.D., Halifax, N. S	

REGULAR MEMBERS.

ADAMS, A. W.	BELDING, A. M.	CAMPBELL, G. WILFORD
ADDY, H. G., M. D.	BELL, THOMAS	CHRISTIE, W. A.
AGAR, M. E.	BELYEA, J. FRED	CHRISTIAN, THOMAS R.
ALWARD, SILAS	BONNELL, F. S.	CLAWSON, JOSHUA
ANGLIN, J. V., M. D.	BONNELL, W. P.	CLARKE, C. P.
BANKS, J. W.	BOSTWICK, C. M.	CORBITT, SAMUEL A.
BARNHILL, G. E.	BOURNE, T. PERCY	COSTER, J. ARTHUR
BARBOUR, A. D.	BOURNE, H. C.	CROSBY, L. G.
BARBOUR, G. E.	BRODIE, WM.	CUSHING, THEOPHILUS
BARKER, L. W.	BRUCKOFF, WM.	DAY, J. L.
BARNES, J. W.	BURDITT, W. F.	DICKIE, REV. GORDON
BAXTER, J. B. M.	BUSTIN, STEPHEN B.	DOHERTY, H. A.
	BULLOCK, T. H.	

DOWNIE, WM.	HUNT, DONALDSON	PATTERSON, R. B.
DYKEMAN, F. A.	HUTCHINSON, D. LEAVITT	PETERS, CHARLES H.
EDWARDS, M. B.	HUTCHINSON, REV. DAVID	PHILPS, ERNEST L.
ELLIS, F. B.		
ELLIS, W. L., M. D.	INCHES, P. ROBERTSON, M.D.	POWELL, H. A.
EMERSON, R. B.	JARVIS, C. E. L.	PUDDINGTON, HENRY
EMERSON, H. W.	JARVIS, W. M.	RAYMOND, W. E.
EMERSON, STANLEY L.	JONES, FRED CAVERHILL	RISING, E. L.
ESTEY, JAMES A.	JONES, COL, G. WEST	ROBERTSON, JAMES F.
ESTABROOKS, W. G.	JONES, J. B.	ROBERTSON, GEO. M.
FAIRWEATHER, G. ERNEST	JONES, R. KELTIE	RUEL, F. H. J.
FERGUSON, J. R.	KERR, S.	RYERSE, ERNEST
FISHER, W. S.	KESSEN, R. B.	SANFORD, CHARLES F.
FINLEY, JOSEPH	KNOWLTON, F. J. G.	SCAMMELL, J. K., C. E.
FLANDERS, C. R., D. D.	LANTALUM, T. T.	SEARS, EDWARD
FLEMING, GEO.	LEAVITT, R. T.	SEELY, ALFRED
FLEMING, W. M.	LIKELY, J. A.	SHARP, A. W.
FORBES, HON. J. G.	LONG, JOHN W.	SHEWEN, E. T. P., C. E.
FOSTER, W. E.	MAGEE, J. M., D. D. S.	SINCLAIR, J. A.
FOLEY, FENWICK D.	MANCHESTER, JAMES	SKINNER, HON. C. N.
FRINK, R. W. W.	MELVIN, GEO. G., M. D.	SKINNER, STEWART, M. D.
GALLAGHER, H.	MORRISON, W. S., M. D.	STARR, F. P.
GIBBON, J. S.	MOORE, GEO. A.	STETSON, H. N.
GILMOUR, A. B.	MOWATT, W. H.	STOCKTON, R. O.
GOLDING, W. E.	MURDOCK, WM., C. E.	STOTHART, THOMAS
GOODSPEED, FRED	MYLES, W. J. S.	SULLIVAN, H. J.
GOODWIN, E. A.	MACINTYRE, JOHN P.	SULLIVAN, RICHARD
GREGORY, J. S.	MACDONALD, CHARLES A.	
HANINGTON, A. H.	MCAVITY, JOHN A.	TENNANT, W. B.
HANINGTON, F. E.	MCAVITY, JAMES L.	THOMPSON, ENOCH
HARVEY, J. N.	McDONALD, ARTHUR	TOWN, HENRY
HATHEWAY, W. F.	McDIARMID, W. L.	
HAWKER, S. H.	MCINERNEY, J. P., M. D.	VROOM, W. E.
HAWKER, WM.	MCINTOSH, J. R., M. D.	
HAY, ALBERT S.	McKENDRICK, DAWSON	
HAYES, R. T.	MCKINNON, H. V.	
HAZEN, A. P.	MCKINNON, J. G.	
HAZEN, HON. J. D.	NOBLES, W. F.	
HENDERSON, G. A.	NORTHRUP, I. H.	
HOBEN, GEO. W.	O'BBIEN, TIMOTHY	
HOLLY, J. WALTER	O'BRIEN, RICHARD	
HOLMAN, F. E.	OLIVE, STANLEY G.	
HOLMAN, PERCY B.	OTTY, G. O. D.	
HOPKINS, STANLEY	PADDOCK, M. V.	
HOYT, G. W.	PAGE, H. C.	
HUBBARD, W. W.		

ASSOCIATE MEMBERS.

ADDISON, MISS A. A.	ALLEN, MISS E.	ANGLIN, MRS. J. V.
ADDY, MRS. H. G.	ALWARD, MRS. S.	ANGUS, MRS. W. M.
ALLEN, MRS. C. B.	ANDERSON, MISS M.	ARSCOTT, MRS. R.

BAKER, MRS. C. F.	CREIGHTON, MRS. H.	GILMOUR, MRS. A. B.
BARBOUR, MRS. G. E.	CROSBY, MRS. L. G.	GODSOE, MISS A.
BARBOUR, MISS M.	CURREY, MRS. L. A.	GODSOE, MISS I.
BARKER, MRS. E. F.	CURRIE, MRS. J. S.	GOLDING, MRS. WM. E.
BARKER, MISS HELEN		GOODSPEED, MRS. F.
BARKER, MRS. L. W.	DAWSON, MISS J. C.	GORHAM, MRS. C. F.
BARLOW, MRS. J. R.	DAY, MRS. J. L.	GRANNAN, MRS. P.
BARNES, MISS C. F.	DEVER, MRS. M.	GRASS, MRS. M. E.
BARNES, MISS E.	DISBROW, MISS E.	GREEN, MRS. L.
BARTLETT, MISS K. R.	DOWLING, MRS. T. Q.	GREER, MRS. WM.
BARTON, MRS. J. H.	DRISCOLL, MRS. J.	GREGORY, MRS. S.
BELL, MRS. T.	DUNHAM, MRS. W. O.	GRUNLUND, MRS. S.
BENNET, MRS. W. R.	DUNN, MRS. J. L.	GUNN, MISS M. G.
BENT, MISS	DUNN, MISS L.	
BEST, MISS H. L.	EARLE, MRS. W. Z.	HALEY, MRS. R. G.
BEST, MRS. M. E.	EDGEcombe, MRS. D.	HANNINGTON, MRS. F. E.
BLACK, MRS. K. E.	EDWARDS, MRS. M. B.	HAMILTON, MRS. G. A.
BLACK, MRS. S. McC.	ELKIN, MRS. S.	HAMM, MRS. W. L.
BLIZZARD, MISS A.	ELLIS, MRS. F. B.	HARDING, MRS. J. S.
BLIZZARD, MRS. F. W.	ELLIS, MRS. J. V.	HARDING, MRS. W. L.
BOGART, MRS. T.	EMERSON, MISS E. L.	HARRISON, MISS L. G.
BONNELL, MRS. W. P.	EMERSON, MRS. R. B.	HARVEY, MRS. J. N.
BOURNE, MRS. H. C.	ESTABROOKS, MRS. T. H.	HATHEWAY, MRS. W. F.
BOURNE, MRS. T. P.	ESTABROOKS, MRS. W. G.	HAWKER, MRS. S. H.
BOWMAN, MRS. C.	ESTEY, MISS A. E.	HAY, MRS. G. U.
BOYER, MRS. B. N.	ESTEY, MISS GRACE	HAYES, MRS. R. T.
BRAINE, MISS	ESTEY, MRS. JAS. A.	HAYWARD, MRS. W. H.
BRODIE, MISS C.	ESTEY, MRS. J.	HAZEN, MRS. R. M.
BUCHANAN, MRS. G. T.	EVERETT, MRS. H. L.	HEA, MISS A. M.
BULLOCK, MRS. J. F.	FAIRWEATHER, MISS A.	HENDERSON, MRS. GEO. A.
BULLOCK, MRS. T. H.	FAIRWEATHER, MRS. C. H.	HENNING, MRS. W.
BURDITT, MRS. W. F.	FAIRWEATHER, MRS. G. E.	HOLMAN, MRS. A. L.
BURDITT, MISS	FINLEY, MRS. J.	HOLMAN, MRS. F. E.
CAIE, MISS I. J.	FISHER, MRS. G. S.	HOMER, MISS E. B.
CALHOUN, MRS. J. R.	FISHER, MRS. W. S.	HOPKINS, MRS. S
CAMPBELL, MRS. G. M.	FISKE, MRS. E. S.	HOYT, MISS F. A.
CAMPBELL, MRS. G. W.	FLANDERS, MRS. C. R.	HOYT, MRS. G. W.
CASE, MRS. (Dr.)	FLEMING, MISS G.	HOYT, MISS M. E.
CASSON, MISS A.	FLEMING, MRS. W. M.	HUESTIS, MRS. L. S.
CASSON, MRS. R.	FLOOD, MRS. THOS. J.	HUNT, MISS L. A.
CHANDLER, MRS. A. H.	FORBES, MRS. M. M.	HUNT, MRS. D.
CHRISTIAN, MISS	FOTHERBY, MISS E. P.	HUTCHINSON, MRS. D.
CHRISTIE, MISS	FOTHERBY, MISS M.	
CLIFT, MISS B.	FOULIS, MISS J.	INCHES, MRS. P. R.
COCHRANE, MRS. R. J.	FREEZE, MRS. R. J.	INGRAHAM, MISS L. G.
COLE, MRS. HORACE	FRENCH, MISS M. P.	ISAACS, MISS A.
CORBETT, MRS. R. A.	FRINK, MISS G.	ISAACS, MISS L.
COSTER, MRS. A.	FRINK, MRS. J. H.	ISAACS, MISS R.
COSTER, MRS. C.	FRINK, MRS. R. W. W.	JACK, MISS A. D.
COSTER, MISS L.	FULLERTON, MISS C.	JARDINE, MISS M.
COTTER, MISS K. A. M.	GIBBARD, MRS. T.	JONES, MRS. F. C.
COUPE, MRS. R. E.	GIBSON, MISS M.	JONES, MRS. J. B.
COWAN, MRS. C. E.	GILCHRIST, MRS. W.	JORDAN, MRS. M. C
COWAN, MRS. R. P.		KEITH, MRS. L. A.
COWGILL, MRS. F. B.		

KERR, MRS. S.
 KIMBALL, MRS. G. A.
 KIRKPATRICK, MRS. A.
 KNIGHT, MRS. F.
 KNODELL, MRS. J. C.
 LANDAU, MISS R.
 LANDRY, MRS. I. J. D.
 LANE, MRS. F.
 LAWRENCE, MRS. J. M.
 LEAVITT, MRS. D.
 LEAVITT, MRS. R. T.
 LEE, MRS. C. H.
 LEE, MISS E. A.
 LEE, MRS. G.
 LEE, MRS. T. C.
 LIKELY, MRS. J. A.
 LINDSAY, MISS M.
 LINGLEY, MRS. B.
 LINGLEY, MRS. D. G.
 LORDLY, MRS. C. E.
 LOWE, MRS. C.
 MACAULAY, MRS. A.
 MACDONALD, MRS. CHAS.
 MC AVITY, MRS. G.
 MC AVITY, MRS. J. L.
 MC AVITY, MRS. J. H.
 MC AVITY, MRS. J. A.
 MC AVITY, MISS M.
 MC BEATH, MISS E.
 MC CLASKEY, MRS. A. A.
 MC INERNEY, MRS. J. P.
 MC INNIS, MRS. A.
 MC INTOSH, MRS. J. R.
 MC INTOSH, MRS. WM.
 MC INTYRE, MRS. WM.
 MC INTYRE, MRS. W. C.
 MC KAY, MRS. W. M.
 MC KEAN, MRS. G.
 MC KENDRICK, MRS. D.
 MC KENNA, MISS E.
 MC KEOWN, MRS. H. A.
 MC KINNON, MRS. H. V.
 MC LAREN, MRS. J. S.
 MC LELLAN, MRS. D.
 MC MILLAN, MRS. J.
 MC NAUGHTON, MISS E.
 MAGEE, MRS. J. A.
 MANNING, MISS S.
 MARTIN, MRS. W. A.
 MATTHEW, MRS. W. C.
 MATTHEW, MRS. R.
 MAXWELL, MISS L.
 MAXWELL, MISS O.
 MELLICK, MRS. C.

MELROSE, MRS. A. R.
 MERRILL, MRS. A. H.
 MERRITT, MISS MAUDE
 MILLER, MISS P. E.
 MOORE, MRS. J. E.
 MORRISON, MRS. A.
 MORRISON, MISS B.
 MORRISON, MRS. W. S.
 MURCHIE, MRS. E. H.
 MURDOCH, MISS E.
 MURPHY, MISS G.
 MURRAY, MISS E. L.
 MURRAY, MISS F. E.
 MURRAY, MRS. F. W.
 MURRAY, MRS. G.
 MURRAY, MISS I. L.
 MURRAY, MISS P. O.
 MYLES, MRS. W. H.
 NANNARY, MISS M. A.
 NASE, MRS. O.
 NEALES, MRS. WM.
 NOBLE, MRS. G. W.
 OLIVE, MISS K.
 PADDOCK, MRS. M. V.
 PAGE, MRS. H. C.
 PALMER, MRS. CHAS. A.
 PARKS, MISS M., M. D.
 PATERSON, MRS. R. B.
 PATERSON, MRS. W. F. B.
 PATTERSON, MRS. A. P.
 PAYSON, MISS S. T.
 PECK, MRS. H. B.
 PERKINS, MISS F.
 PETERS, MRS. C. H.
 PETERS, MRS. F. A.
 PHILPS, MRS. E. L.
 PICKETT, MRS. H. H.
 PORTER, MRS. A.
 POWELL, MRS. H. A.
 POWELL, MISS
 PRICE, MISS B.
 PRICE, MRS. G. R.
 PUDDINGTON, MISS A.
 PUDDINGTON, MISS J. E.
 PULLEN, MRS. J. H.
 RAINNIE, MISS A. M.
 RANKINE, MRS. T. R.
 RANKINE, MRS. R. R.
 RISING, MRS. E. L.
 RITCHIE, MRS. R. J.
 ROBB, MISS A. D.
 ROBERTSON, MRS. GEO. M.

ROBERTSON, MRS. J. F.
 ROBERTSON, MRS. J. M.
 ROBINSON, MISS E.
 ROBINSON, MISS J. L.
 ROBINSON, MRS. J. M.
 ROBSON, MRS. W. L.
 ROWAN, MISS J.
 SADLEIR, MRS. WM. H. B.
 SADLEIR, MISS
 SALMON, MRS. J. J.
 SALTER, MRS. E. V.
 SANFORD, MRS. C. F.
 SCHAEFER, MRS. H. H.
 SCHOFIELD, MRS. H. B.
 SCHOFIELD, MRS. J. K.
 SCOTT, MRS. N. C.
 SCOVIL, MRS. E. G.
 SEALY, MRS. JOHN
 SECORD, MRS. J. E.
 SEELY, MRS. FRED
 SEELY, MISS JEAN
 SHARPE, MRS. J. A.
 SHEFFIELD, MRS. M. A.
 SHERIDEN, MRS. R. A.
 SINCLAIR, MRS. R. A.
 SIPPRELL, MRS. E. M.
 SKINNER, MRS. A. O.
 SKINNER, MRS. S.
 SMITH, MISS A. L.
 SMITH, MRS. E. A.
 SMITH, MISS E. B.
 SMITH, MRS. G. F.
 SMITH, MRS. H. C.
 SMITH, MRS. J. W.
 SMITH, MRS. R. M.
 SNIDER, MRS. P. W.
 SPANGLER, MRS. H. L.
 STEPHENSON, MISS M.
 STERLING, MRS. J.
 STETSON, MRS. F.
 STEVENS, MRS. ROY
 STEWART, MISS I.
 SULLIVAN, MRS. H. J.
 SULLIVAN, MRS. R.
 SUNDER, MRS. C. E.
 SUTHERLAND, MISS K. M.
 TAYLOR, MRS. E. R.
 TENNANT, MRS. W. B.
 THOMAS, MRS. F. S.
 THOMAS, MRS. HENRY
 THOMSON, MRS. J. H.
 THOMPSON, MRS. J. S.
 THOMSON, MRS. ROBT.
 THOMSON, MISS M.
 THORNTON, MRS. J. B.

TINGLEY, MISS E. A.
 TRITES, MRS. E. A.
 TUCK, MRS. W. H.
 TURNER, MISS K. E.
 VAUGHAN, MRS. J. R.
 VAUGHAN, MRS. S. B.
 VAUGHAN, MRS. S. T.
 VINCENT, MISS H.
 VINCENT, MRS. T. N.
 WADE, MRS. JOHN

WARD, MISS H. M.
 WARDROPER, MRS. H. E.
 WARING, MISS A. G.
 WARING, MRS. W. L.
 WARLOCK, MRS. B. B.
 WARNER, MRS. J.
 WASSON, MISS M.
 WATT, MRS. J. G.
 WATT, MRS. M.
 WELDON, MRS. C. W.
 WETMORE, MRS. A. H.
 WETMORE, MRS. H. C.

WHITE, MRS. J. H.
 WHITE, MRS. THOS. F.
 WHITE, MRS. W. W.
 WHITTAKER, MRS. E. L.
 WILLIAMS, MRS. F. E.
 WILLIAMS, MRS. J. D.
 WILMOT, MISS E. B.
 WILSON, MISS C.
 WILSON, MRS. J. E.
 WOODBUR, MISS E. A.
 WOODMAN, MRS. A. M.
 WORDEN, MISS D.

JUNIOR MEMBERS.

ARMSTRONG, CHRISTOPHER

GIBSON, MILES
GOLDING, KENNETH L.MACHUM, RALPH
MORRISEY, GEORGE
MORRISEY, HENRY F.

BAKER, J. RENWICK

HOLMAN, DOUGLAS
HOLMAN, HARRY
HUNT, H. EVERETT

PATTERSON, EDWIN

BLAIR, G. D. C.

KINGSTON, ROWLANI

SECORD, CHAS. M.

BOURNE, G. C.

LANE, JOHN

THOMPSON, STANLEY
TAYLOR, ELLIS

BOURNE, C. P.

LEAVITT, RONALD
LEE, A. ROLAND
LINGLEY, GORDONWETMORE, CLARENCE
WILLET, ARTHUR
WILLET, GORDON

CAMPBELL, LLOYD

JUNIOR ASSOCIATE MEMBERS.

CLARK, HAROLD

FREEZE, MISS JANE

MURDOCH, MISS MARY
MACKINNON, MISS E

DAVIS, EDWIN

GRUNLUND, MISS VEGA

VANWART, MISS MYRTLE

DAVIS, KENNETH S.

KAYS, MISS LEONA
KEE, MISS E. M.
KNIGHT, MISS JESSIEWILLIAMS, MISS MABEL
WILLIAMS, MISS NETTIE

ELLIS, SHIRLEY

LEAVITT, MISS JEAN

DENHAM, MISS MURIEL

